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Fisheries & Environment
Forestry Service

1977 ANNUAL DISTRICT REPORT FOREST INSECT AND DISEASE SURVEY NEWFOUNDLAND

by: L.J. Clarke, E.C. Banfield, W.J. Sutton, D.M. Stone,
D.S. O'Brien, K.E. Pardy, G.C. Carew and E.C. Salter

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ABSTRACT

This report gives a detailed account of the major forest insects and diseases of Newfoundland and Labrador in 1977 and tabulates the other noteworthy pests of the region.

RÉSUMÉ

Ce rapport donne un exposé détaille des prinicpaux insectes et maladies des forêts de Terre-Neuve et du Labrador en 1977. Il liste les autres agents nuisibles qui sont importants pour la region.

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INTRODUCTION

This annual district report describes the status of insect and disease conditions in the 12 forest districts (Fig. 1) and in urban areas of the Province. A total of 815 insect and 91 disease collections were processed by the Forest Insect and Disease Survey. Twelve new insect species were identified in these samples. An additional 943 samples were collected during the spruce budworm egg-mass survey and 285 during the hibernacula survey.

Aerial surveys of the Island and Labrador were conducted in September and approximately 50 hours were flown in fixed-wing aircraft and 150 hours in helicopter, for the spruce budworm egg-mass survey and on damage assessment surveys. The Forest Protection Division of the Provincial Department of Forestry and Agriculture provided most of the aircraft time and assisted in the spruce budworm egg-mass sampling and counting. Personnel from the National and Historic Parks Branch of the Department of Indian Affairs and Northern Development collected spruce budworm egg-mass samples in the Terra Nova and Gros Morne National Parks.

In 1977 forest insect and disease survey personnel also established 10 permanent sample plots for monitoring insect and disease conditions; lectured forestry students of the College of Trades and Technology and a group of conservation students from across Canada on insect and disease conditions in the Province; assisted the Department of Forestry and Agriculture, Forest Protection Division, by providing a plan for monitoring the spruce budworm and instructing field crews in sampling methods and supervising students in insect counting for an experimental spruce budworm chemical control program; collected Elateridae spp. (click beetles) as a contribution to the pilot project of the biological survey of the insects of Canada; collected tussock moth eggs for research studies by Dr. J.C. Cunningham of the Insect Pathology

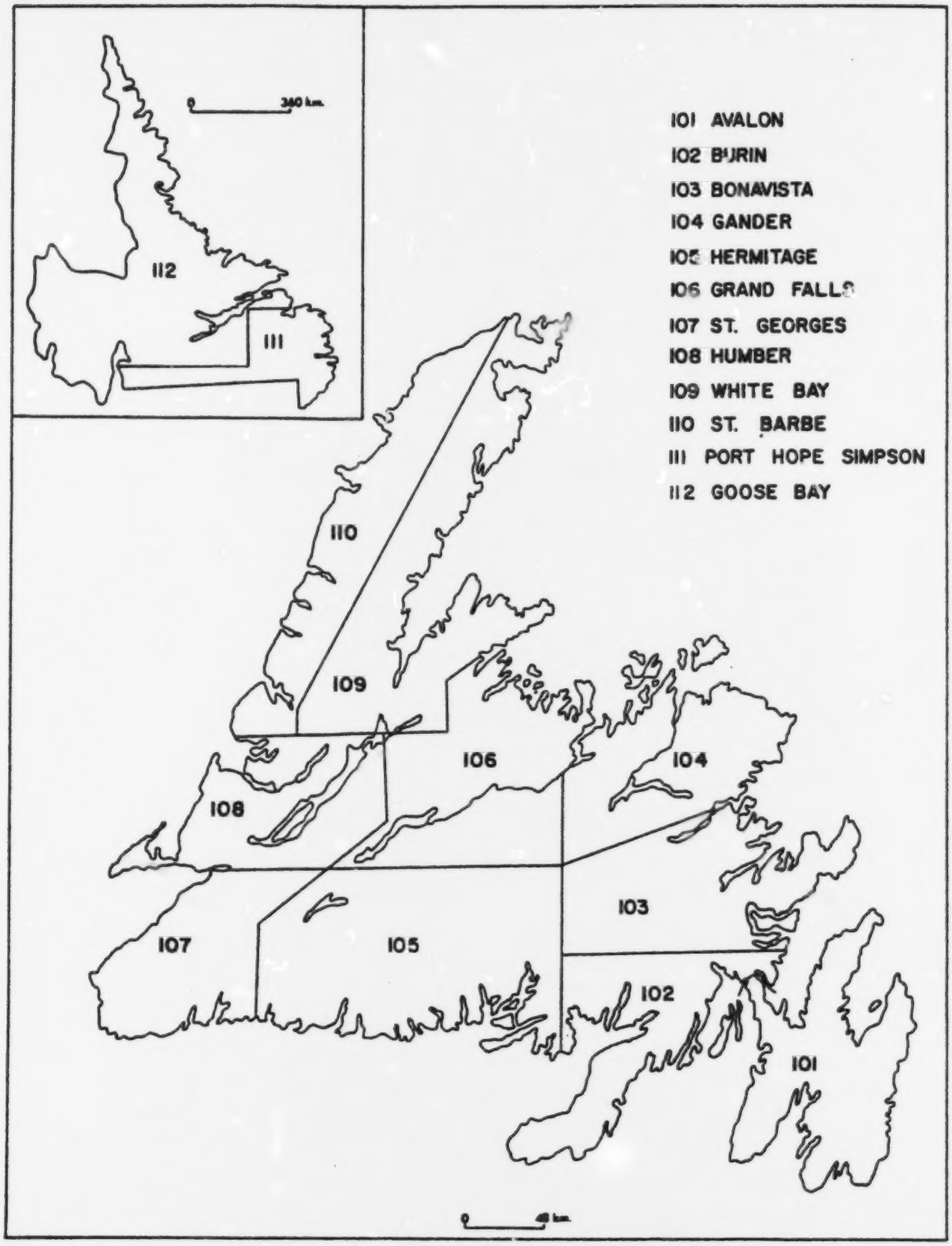

Fig. 1. Forest Insect and Disease Survey Districts.

Research Institute, Sault Ste Marie; conducted a five-day trapping program to monitor population levels of the masked shrew; advised municipal councils and property owners on identification and control of insects and diseases on ornamental trees and attended an Area Development conference on forestry problems in Baie D'Espoir.

From May to early July, cool wet weather accompanied by high winds prevailed throughout western and part of central Newfoundland setting a new precipitation record for western Newfoundland. Warm, dry conditions occurred throughout eastern Newfoundland. Labrador weather was cool, and wet throughout the summer with patches of snow visible all summer in the Cartwright area and numerous icebergs visible along the coast. Temperatures and precipitation for the past seven years are shown in Table 1.

The spruce budworm continued to be the major insect pest in the Province for the sixth consecutive year. The blackheaded budworm populations showed a sharp decline in eastern Newfoundland, on the Northern Peninsula and in Labrador. The eastern hemlock looper continued to increase on the Island especially in areas where spruce budworm populations had decreased. Balsam fir sawfly population levels collapsed in Labrador and remained low on the Island. There was no appreciable change in the balsam woolly aphid population levels and larch casebearer were reported in outbreak numbers in the Terra Nova National Park and in the St. John's area. The larch sawfly populations were lower than 1976 but severe defoliation occurred throughout the outbreak area. The birch casebearer outbreak was the most widespread and severe ever recorded on the Island. Other hardwood defoliators such as the large aspen tortrix, poplar leaf roller, ugly nest caterpillar, satin moth, tussock moth, mountain ash sawfly and the fall webworm were collected in high numbers in localized infestations.

Broom rusts of balsam fir and spruce continued to be the most conspicuous disease of forests on the Island. Dothichiza canker of lombardy poplar continued to be the most important disease in residential areas on the Island. A moderate to severe infection of ink spot of trembling aspen continued in the Goose Bay area.

Frost damage of balsam fir regeneration in logged over areas was widespread and extensive throughout the Island. Other common tree diseases such as shoot and leaf blight of aspen, needle rusts, leafspots and rust galls were generally low and caused minor damage.

Table 1. Temperatures and total precipitation for Newfoundland, 1971-1977.

Year	Location	Temperature (°C)								Precipitation (cm)			
		May		June		July		August					
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	May	June	July	August
1971	St. John's	- 3	23	2	27	4	27	7	28	4.24	9.37	14.68	15.04
1972	"	- 7	26	1	26	4	28	6	25	10.44	9.75	1.93	11.81
1973	"	- 2	19	-1	24	9	28	6	26	12.24	15.88	6.60	19.15
1974	"	- 2	14	-1	28	1	26	5	24	10.87	6.12	9.12	14.40
1975	"	- 2	22	0	26	2	29	5	27	22.02	11.18	1.93	14.53
1976	"	- 2	22	0	28	-1	27	1	28	4.09	10.65	7.76	5.48
1977	"	- 4	18	2	28	7	27	7	28	7.60	9.53	8.30	5.44
1971	Gander	- 2	26	2	28	4	28	4	28	2.49	5.77	7.95	7.95
1972	"	- 9	28	2	28	5	31	5	26	13.34	9.80	4.52	6.25
1973	"	- 2	22	-1	28	8	29	5	24	9.83	14.63	5.92	16.21
1974	"	- 3	14	-2	28	1	26	4	27	7.11	10.64	5.05	5.26
1975	"	- 4	21	-2	25	5	34	5	29	17.93	2.44	6.20	6.03
1976	"	- 3	25	-1	30	3	29	4	33	3.91	8.52	7.07	1.94
1977	"	- 2	21	2	28	6	28	6	29	9.96	4.71	10.00	8.25
1971	Deer Lake	- 5	26	-1	29	3	30	1	31	4.19	6.07	6.30	13.61
1972	"	- 8	24	-1	28	-1	31	-1	28	9.45	10.21	4.04	9.32
1973	"	- 3	23	-3	27	3	31	3	28	6.65	15.29	8.69	13.28
1974	"	- 4	14	-4	31	0	29	-1	31	3.56	2.21	8.99	6.27
1975	"	- 6	22	-3	27	1	33	0	31	6.60	4.72	3.71	8.10
1976	"	- 5	28	0	29	4	32	-2	33	7.18	5.60	3.02	4.88
1977	"	- 7	24	-2	29	4	29	-3	29	7.54	4.64	2.05	8.49
1971	Goose Bay	- 6	26	1	26	2	30	1	31	7.84	10.49	9.90	14.09
1972	"	-15	16	-2	32	4	33	1	29	3.71	11.25	5.64	13.64
1973	"	- 7	23	-1	31	6	33	2	28	3.33	11.30	12.06	6.53
1974	"	- 5	14	-1	33	1	31	1	30	3.83	5.94	6.20	8.38
1975	"	- 8	16	-1	27	4	37	2	27	1.93	7.62	6.83	6.17
1976	"	- 4	21	-1	27	4	29	0	33	2.96	2.00	9.40	14.25
1977	"	- 6	18	-1	31	5	32	6	30	11.61	5.80	9.63	10.69

IMPORTANT FOREST INSECTS

Spruce Budworm, Choristoneura fumiferana (Clem.) — In 1977 larval activity commenced one to two weeks later than usual and defoliation was not observed until late June. The outbreak covered virtually all of the forest areas on the Island. In western Newfoundland from Robinsons River to Georges Lake, larval populations were high (up to 500 per tree sample) and tree defoliation severe. However, from Georges Lake to Bonne Bay and south of the Trans Canada Highway to Badger, larval populations were considerably lower (up to 85 per tree sample) and defoliation, although widespread and severe, was not as extreme as 1976 (Table 2). The probable reasons for the decline in larval populations in this area were unfavourable weather conditions and starvation. Severe defoliation and high population levels were also recorded north of the Trans Canada Highway from White Bay east to St. John's, throughout the Bonavista and Avalon peninsulas, from Badger south to Baie D'Espoir and in isolated spots near Red Indian Lake and from Roddickton to Ten Mile Lake (Figs. 2, 3, 4 and 5). Another observation was the high numbers of budworm that overwinter on larch and cause complete defoliation in early summer. There was considerable defoliation of larch in many areas of central and eastern Newfoundland in 1977 particularly on Random Island and throughout the Terra Nova National Park. However, by late August virtually all of the larch in these areas had refoliated.

Damage Assessment

The annual aerial defoliation survey scheduled for early August was cancelled because heavy rains and high winds washed off the damaged and reddened foliage making it impossible to record tree defoliation from the air. However, a special aerial damage assessment survey, augmented with ground checks, was conducted in late August to determine the areas and merchantable volume of dead and damaged stands. This survey classified the merchantable forests of the Island into four major categories, A - dead standing; B - moribund, severely damaged and not likely to survive; C - severely damaged but should recover; and D - very light or no damage. All watersheds and other forested areas were surveyed from a fixed-wing aircraft. The survey showed 275 areas classed as A and B. Approximately 100 ground checks were made in these areas by helicopter to check the aerial classification and to estimate wood volume. The area of merchantable stands classified as dead was 64 013 ha containing an estimated 5 137 705 m^3 of wood. The area of moribund stands totalled about 110 519 ha with approximately 8 507 165 m^3 of wood (Table 3). Mature stands severely damaged but likely to survive totalled 773 738 ha.

Table 2.- Average number of spruce budworm larvae collected in ranger districts in 1976 and 1977.

District	No. trees sampled 1976	No. trees sampled 1977	No. larvae collected 1976	No. larvae collected 1977	No. larvae per tree sample 1976	No. larvae per tree sample 1977
Eastern 101-102-103-104	468	628	33,656	35,696	71.9	56.8
Central 105-106	136	135	23,230	19,395	170.8	143.7
Western 107-108	494	340	30,230	15,926	61.2	46.8
Northern 109-110	302	181	14,675	6,634	48.6	36.7
Labrador 111-112	53	50	1,076	1,434	20.3	28.7
All	1453	1334	102,876	79,085	70.8	59.3

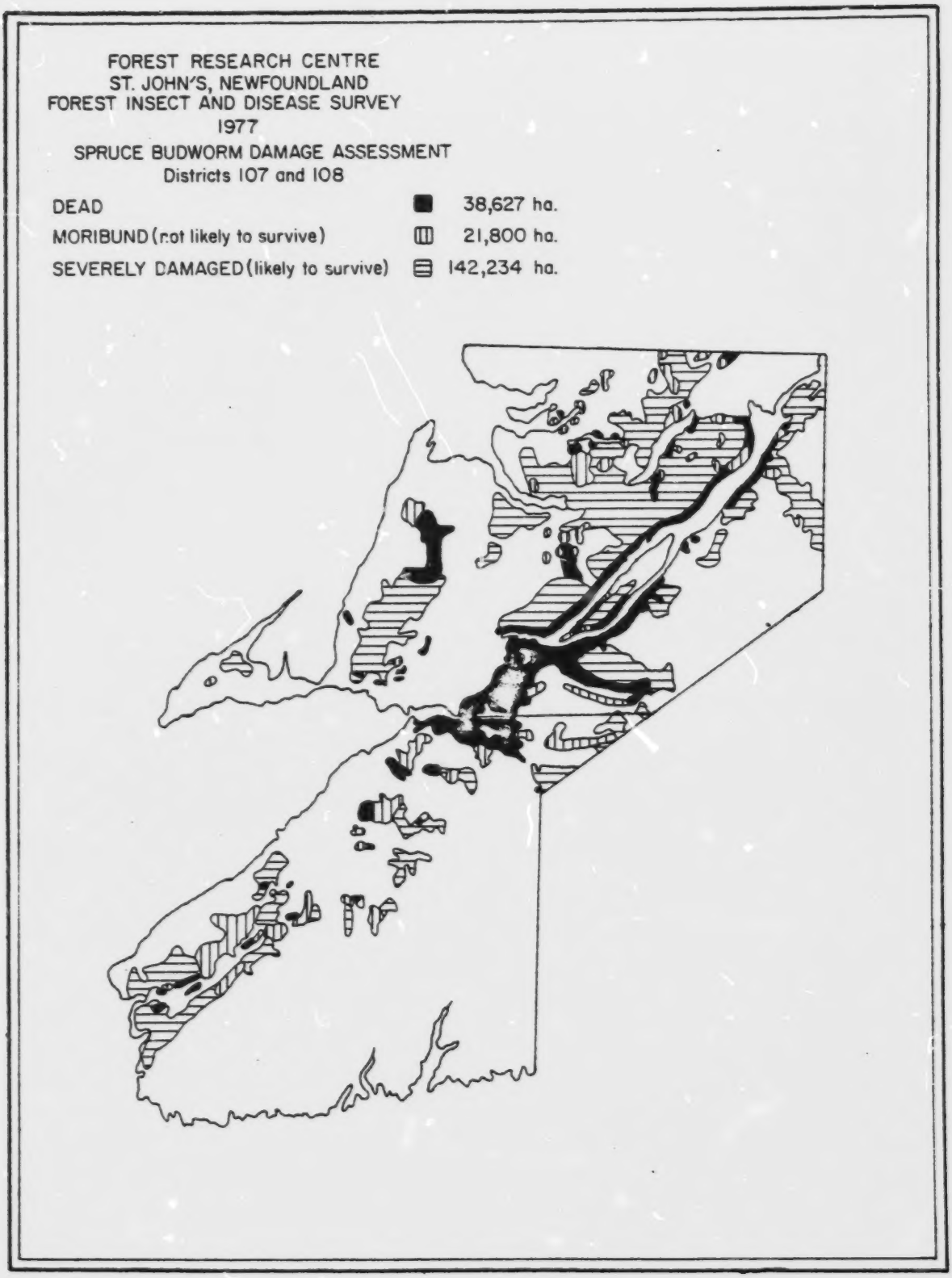
FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1977
SPRUCE BUDWORM DAMAGE ASSESSMENT
Districts 107 and 108
DEAD
38,627 ha.
MORIBUND (not likely to survive)
21,800 ha.
SEVERELY DAMAGED (likely to survive)
142,234 ha.

Fig. 2

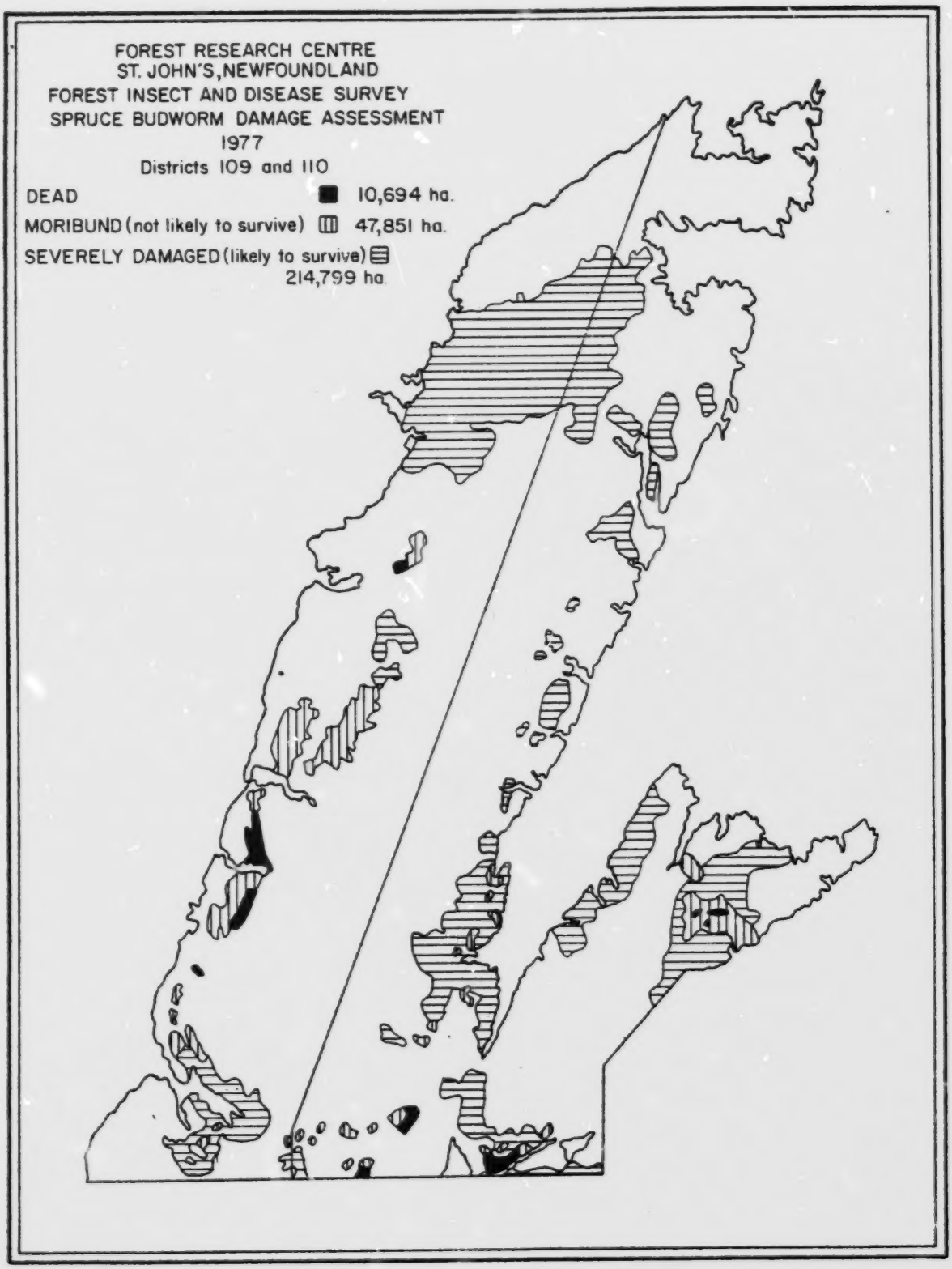
FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
SPRUCE BUDWORM DAMAGE ASSESSMENT
1977
Districts 109 and 110
DEAD 10,694 ha.
MORIBUND (not likely to survive) 47,851 ha.
SEVERELY DAMAGED (likely to survive)
214,799 ha.

Fig. 3

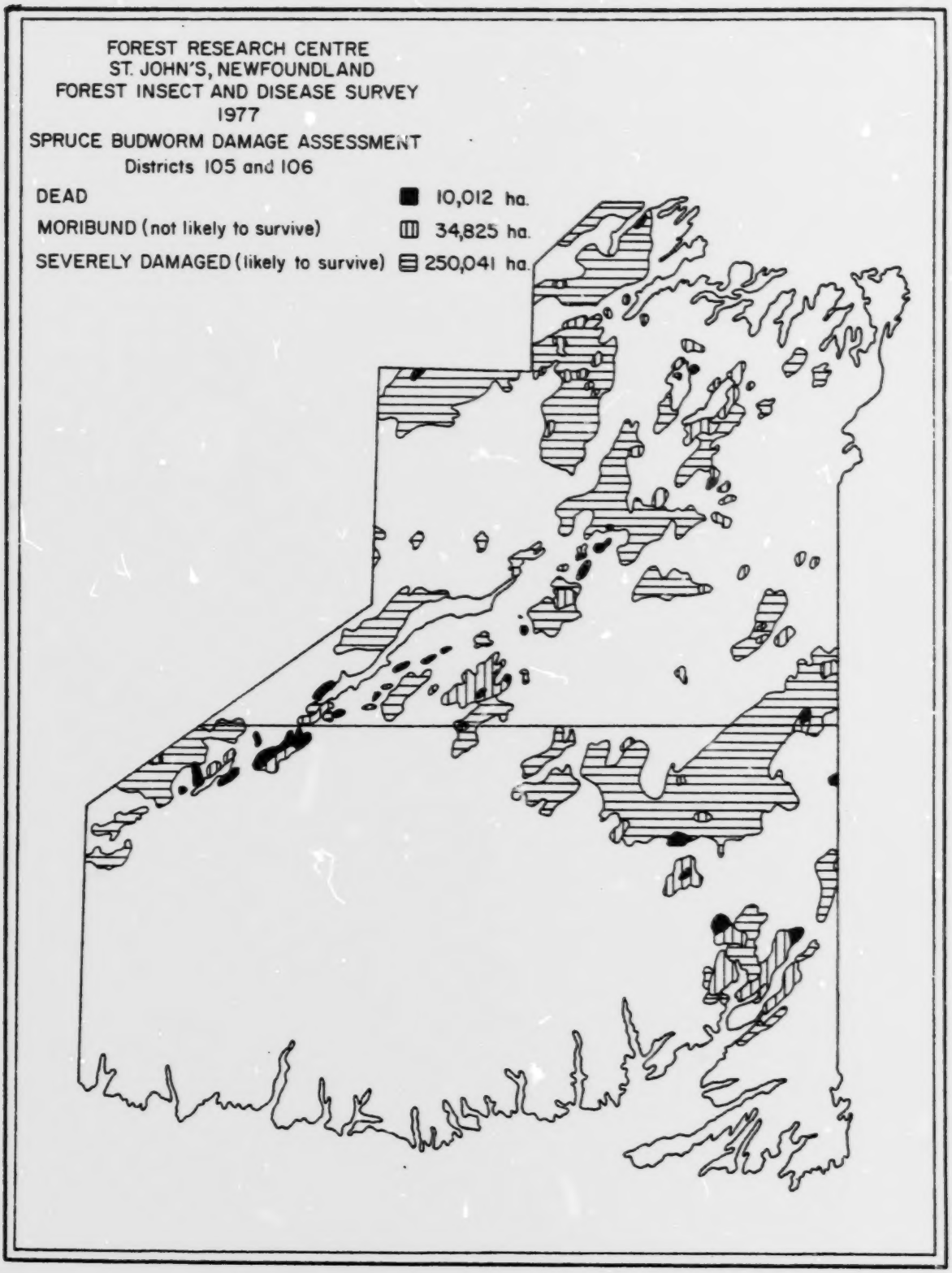
FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1977
SPRUCE BUDWORM DAMAGE ASSESSMENT
Districts 105 and 106
DEAD
10,012 ha.
MORIBUND (not likely to survive)
34,825 ha.
SEVERELY DAMAGED (likely to survive)
250,041 ha.

Fig. 4

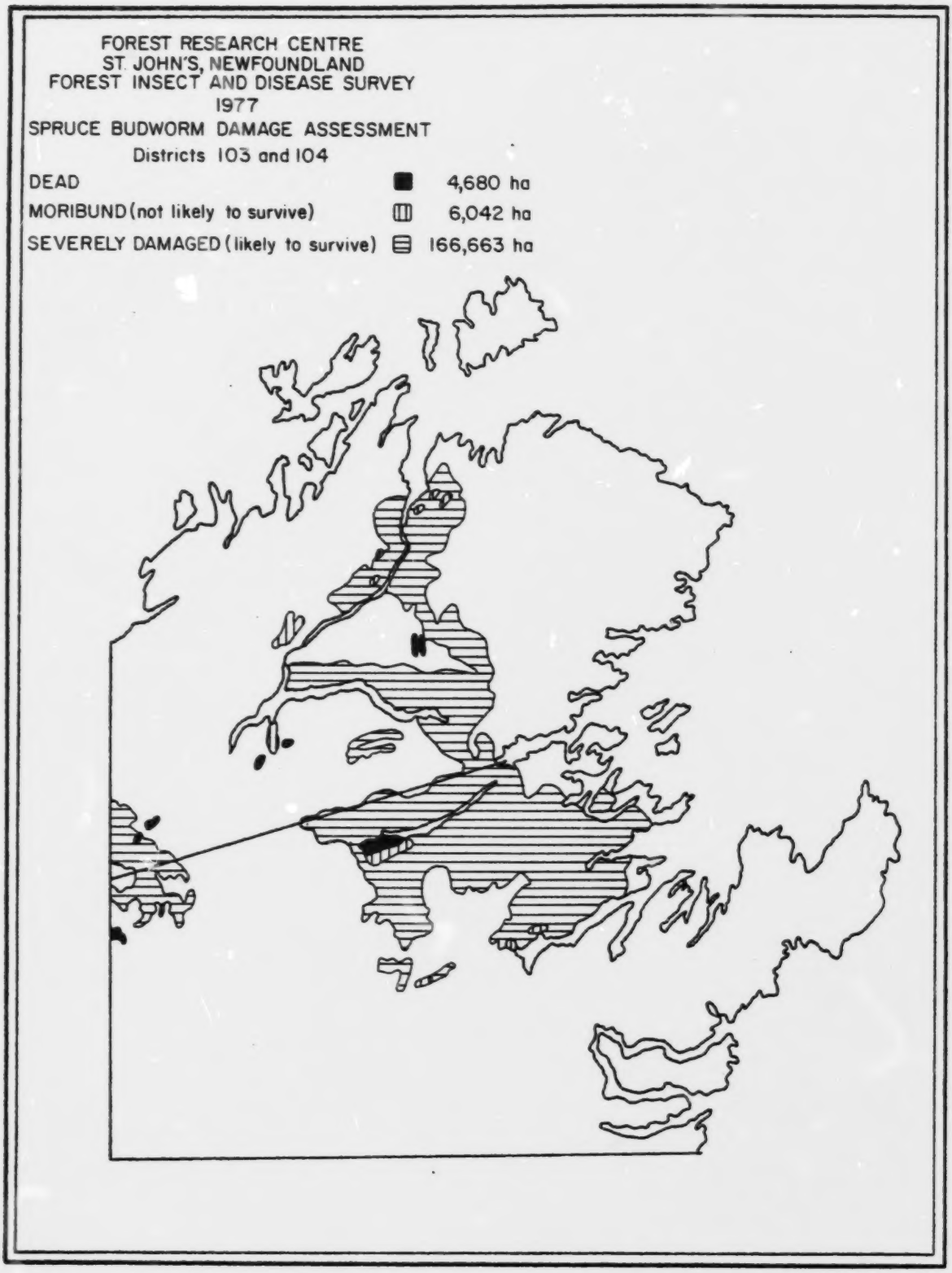
FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1977
SPRUCE BUDWORM DAMAGE ASSESSMENT
Districts 103 and 104
DEAD 4,680 ha
MORIBUND (not likely to survive) 6,042 ha
SEVERELY DAMAGED (likely to survive) 166,663 ha

Fig. 5

Table 3. 1977 Spruce Budworm Damage Assessment Survey (merchantable timber)
Volume Based on 85 cu. ft./cd.

Management Unit No.	Ownership	Area and volume affected			
		A (dead)		B (moribund)	
		Area (ha)	Volume (m^3)	Area (ha)	Volume (m^3)
4	Price	695	50239	1325	76086
6	Bowaters	1762	155418	1056	106351
	Price	-	-	103	5924
7	Bowaters	1490	126662	829	85931
	Crown	8	607	9109	665644
8	Bowaters	-	-	1882	185021
	Price	485	33583	-	-
	Crown	-	-	605	29385
9	Bowaters	1469	128600	7676	626429
	Price	147	16465	2182	192711
	Crown	652	42703	3887	276808
10	Bowaters	-	-	165	16234
	Price	1001	69413	4385	281307
	Crown	-	-	138	3449
11	Price	192	13867	2162	124132
12	Price	2290	193764	5529	377654
	Crown	68	4480	-	-
13	Price	1822	154209	2161	147584
14	Bowaters	14787	1214165	16044	1294271
	Crown	10298	797529	4611	361182
	Private	-	-	603	50273
15	Bowaters	16734	1439942	12669	998215
	Crown	2886	242670	860	64060
16	Bowaters	1587	138910	4465	368614
	Crown	-	-	3404	242689
17	Bowaters	425	37958	11330	978576
	Crown	3112	138816	6400	439873
	GMNP	2103	137700	6396	461091
	TNNP	-	-	543	47672
All	Bowaters	38253	3241655	56117	4659641
	Price	6632	531540	17847	1205398
	Crown	17025	1226810	29013	2083091
	GMNP	2103	137700	6396	461091
	TNNP	-	-	543	47672
	Private	-	-	603	50273
TOTAL ISLAND		64013	5137705	110519	8507165
LABRADOR	CROWN	1819	236384	8187	531867

Damage assessments were also conducted in stands of balsam fir regeneration. Cruise lines were run in 22 areas and consisted of 200-400 metres per line with a one to 4 m^2 plot 20 to 40 m apart, depending on the density of the stands. Results of these surveys showed that the area of severely damaged stands was about 692 491 ha and the area of very severely damaged stands containing some mortality was about 20 313 ha. Tree mortality was low, less than 10% but it was as high as 28% in one plot of larger trees in the Trout Brook area. Stands in this area were severely damaged by the balsam fir sawfly prior to the budworm outbreak. Defoliation by the spruce budworm in stands of regeneration also retarded height growth of balsam fir, most of this height loss resulted from top-killing. Approximately, one to six years height growth have been lost depending on the extent of top-killing in these stands.

A map showing the intensity of defoliation on the Island was also prepared from 923 ground checks made during the egg-mass survey. The areas of productive forests classed into light, moderate and severe defoliation categories are shown in Table 4. The total area of defoliation was about 2 700 000 ha.

In Labrador, the outbreak covered an area of 52 678 ha of mature balsam fir-black spruce forest of which 31 796 ha were in the moderate to severe defoliation class and the remaining 20 882 ha were lightly defoliated (Fig. 6). The volume of dead trees scattered within the severely damaged area was about 236 384 m^3 and an additional 531 867 m^3 were classed as moribund (Table 3).

In 1977 larval and pupal parasitism increased to 35% and reached a high of 80% in some of the older infested areas of western Newfoundland. Parasitism in the late larval and pupal stages probably would have been higher had it not been for the fungal disease, caused by Entomophthora spp., which became widespread in late summer. This disease caused about 30% mortality in late larval and pupal stages and as high as 60% in some locations in western Newfoundland.

Surveys of egg masses and overwintering larvae were conducted at 943 and at 285 locations respectively (Appendices I and II). The results indicate that this insect will continue to be the most important forest pest during 1978. The infestation now covers virtually all of the fir-spruce forest on the Island. Population levels in some areas will be lower than last year but still high enough to cause noticeable damage throughout most of the Island. Severe defoliation will occur in about 1 354 919 ha distributed from the Codroy Valley to the south end of Grand Lake in western Newfoundland and along the northeast coast from White Bay to St. John's and south from Gander to Baie D'Espoir (Fig. 7). This forecast includes an

Table 4.- 1977 spruce budworm defoliation in productive forests in Newfoundland (hectares).*

1:250,000 map sheet	Light	Moderate	Severe	Total
Blanc Sablon	32 439	6 054	33 459	71 952
Port Saunders	55 684	27 722	64 786	148 192
Sandy Lake	399 730	32 985	212 636	645 351
Bay of Islands	7 949	-	-	7 949
Stephenville	158 875	4 194	28 742	191 811
Port aux Basques	15 981	-	231	16 212
Botwood	84 348	3 965	341 538	429 851
Gander Lake	439 840	10 691	247 548	698 079
Red Indian Lake	219 808	21 723	137 531	379 062
Bonavista	24 583	9 386	62 829	96 798
Belleoram	405	-	26 502	26 907
St. John's	2 116	7 844	8 410	18 370
Total	1 441 758	124 564	1 164 212	2 730 534

*Data from defoliation map constructed from ground checks made during spruce budworm egg-mass survey.

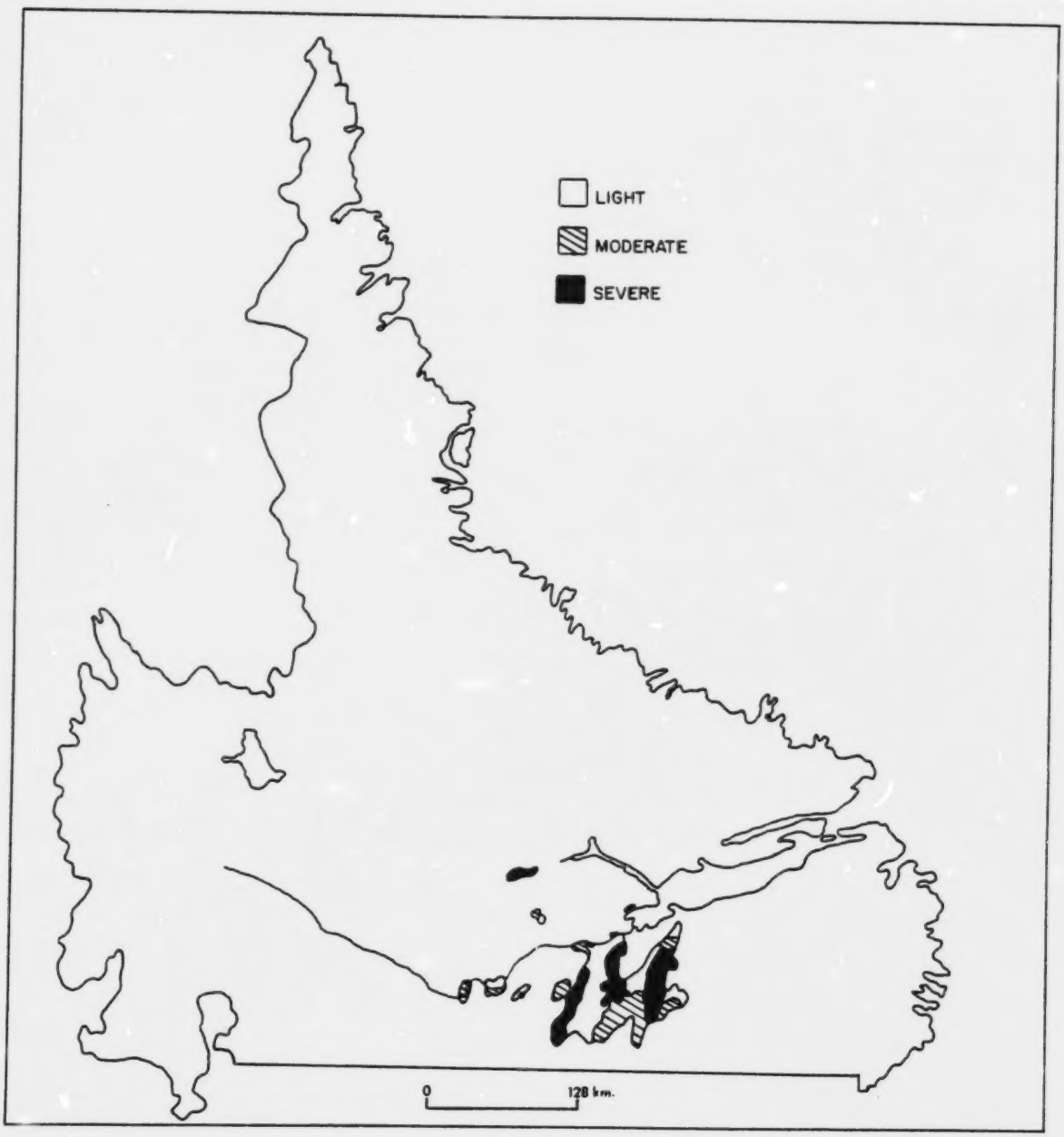

Fig. 6 Spruce budworm defoliation in Labrador - 1977

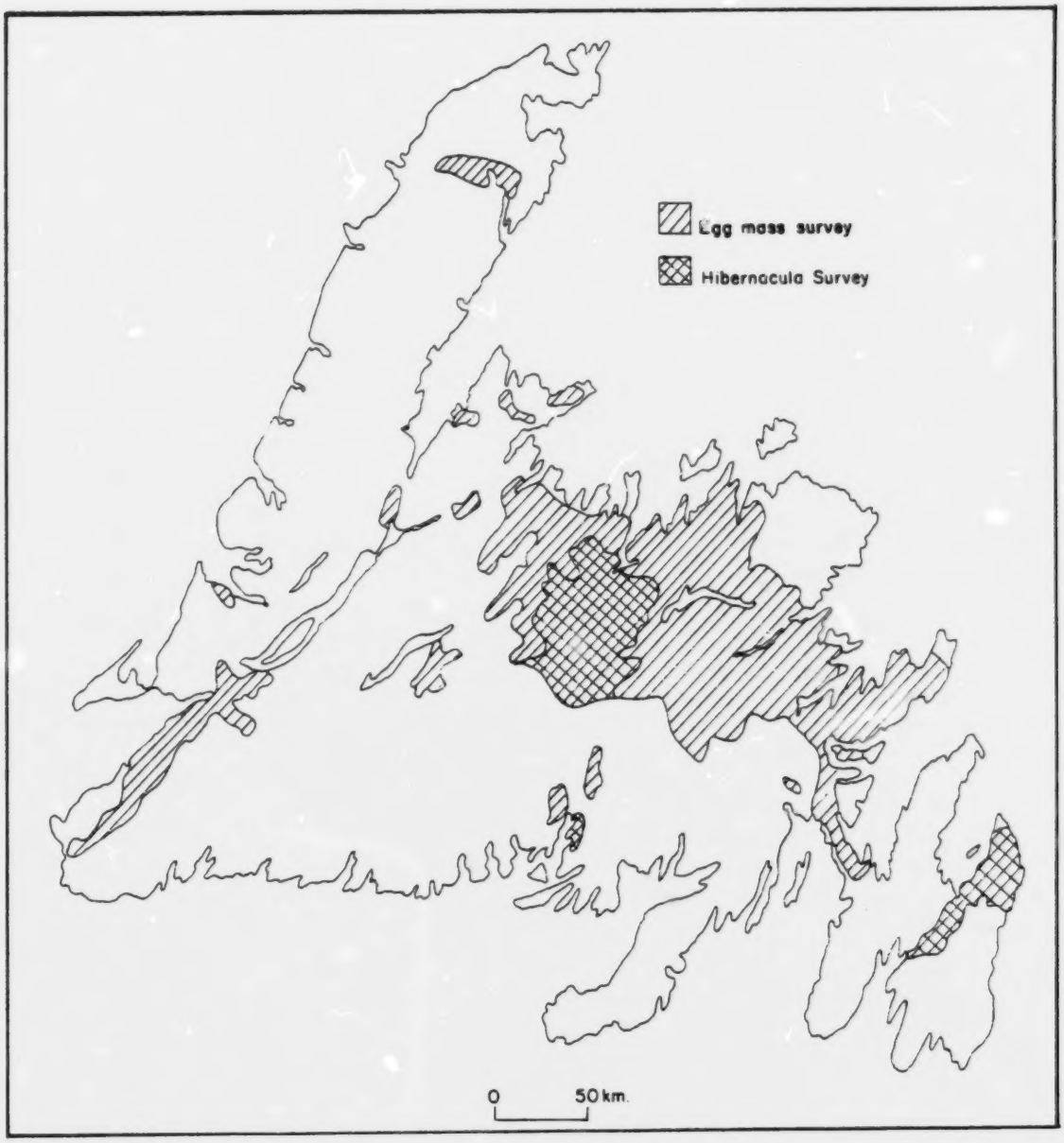

Fig 7. Areas of moderate and severe defoliation predicted for 1978 based on the egg mass survey and the hibernacula survey.

increase of 322 000 ha over predictions based on the egg-mass survey. This increase is attributed to an increase in populations caused by budworm dispersal in some areas, notably the Grand Falls, Gander Lake and Baie D'Espoir areas and the Avalon Peninsula. Tree mortality is forecast to continue in mature stands classified as moribund in 1977 and may increase by 10% particularly in mature stands in western Newfoundland where severe defoliation is predicted and where the budworm has caused severe defoliation for three to four consecutive years. Tree mortality in regeneration and semi-mature stands will occur mainly in western Newfoundland and approximately 50% mortality is expected in stands in the Trout Brook-Harry's River area where 90-100% of the total foliage was destroyed in 1977 and where previous balsam fir sawfly damage occurred. In Labrador the outbreak is expected to remain the same as 1977. The major part of the outbreak and defoliation and tree mortality will be in the mature balsam fir stands in the Kenamu and Traverspine River watersheds and in the Mud Lake area.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1977 - Island	343	0.0	59.4	333.0
1977 - Labrador	17	0.3	28.7	183.3

Eastern Hemlock Looper, Lambdina fiscellaria fiscellaria (Guen.) — Population levels of this insect fluctuated throughout the Province; higher looper counts were found where spruce budworm numbers declined and lower where budworm numbers increased. In eastern Newfoundland the infestation on the Bellevue Peninsula collapsed. Larval numbers were reduced to 7 per tree sample at Whelans Pond and to 11 per tree sample along Cochrane Pond Road. Larval counts from 4 to 7 per tree sample were also collected at Twin Lakes and Lake Ambrose in central Newfoundland and at Goose Arm, Rocky Harbour, Daniels Harbour and South Brook Valley in western Newfoundland.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1977	35	0.1	1.9	25.0
1976	21	0.1	12.9	196.7

Population levels in western Newfoundland are forecast to increase in 1978 especially where spruce budworm numbers will decrease.

Blackheaded Budworm, Acleris variana (Fern,) — The infestations reported in 1976 near Paddys Pond, Terra Nova National Park and Goose Bay collapsed in 1977. Infestations continued in the St. Catherines area where 5-10% defoliation occurred on balsam fir in a 1 375 ha area. Larval counts of 10 per tree sample were collected along the Witless Bay Line but no noticeable

defoliation was observed. Defoliation ranged from 15-90% in mainly balsam fir stands in a 12 000 ha area between Logy Bay and Pouch Cove; in a 3 440 ha area from the Foxtrap access road to Newtown and in a 770 ha area near Bay Bulls Big Pond. Moderate to severe defoliation was also recorded in fir stands from Round Lake to Eddies Cove on the Northern Peninsula although high numbers of the spruce budworm were also collected in this area.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1977 - Island	75	0.0	8.9	85.0
1977 - Labrador	6	0.3	0.7	2.3

Balsam Fir Sawfly, Neodiprion abietis complex — Infestations of this sawfly near Marystown on the Burin Peninsula and along White Bear River and Dove Brook in Labrador collapsed in 1977. Approximately 40% tree mortality occurred on 1 380 ha area along the White Bear River and about 30% mortality on a 465 ha area near Dove Brook. The tree mortality was caused by the combined feeding of the sawfly and the blackheaded budworm.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1977 - Island	5	0.3	0.6	1.3
1977 - Labrador	5	0.3	0.7	1.0

Spruce coneworm, Dioryctria reniculelloides M. & M. — Population levels have increased in 1977 from 4 to 8 larvae per tree sample and collections were made from white spruce, black spruce and balsam fir throughout the Island and Labrador. Damage and defoliation was undetermined because of the concurrent severe damage caused by the spruce budworm.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1977 - Island	56	0.1	8.4	217.7
1976 - "	77	0.3	3.7	27.3
1977 - Labrador	1	1.5	1.5	1.5
1976 "	2	0.3	0.3	0.3

Balsam Woolly Aphid, Adelges piceae (Ratz.) — There was no appreciable change in the distribution or in the intensity of damage in 1977. Infestations reported on Random Island, Bunyans Cove and Swift Current in eastern Newfoundland and Norris Arm-Notre Dame Junction in central Newfoundland remained light and small. No report of new damage was recorded in western Newfoundland.

Larch Sawfly, Pristiphora erichsonii (Htg.) — Population levels of this sawfly increased throughout the Island but caused only light defoliation of tamarack stands. New infestations occurred at Deer Lake, Goose Arm, North Lake, Lomond River and River of Ponds in western Newfoundland. Light defoliation was also recorded in the infestation between St. Georges and South Branch. In Labrador population levels were lower than the 700 per tree sample recorded in 1976. However, defoliation was estimated to be severe and averaged 80-90% in the infested area between Sandwich Bay and Winokapau Lake.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1977 - Island	8	8.0	23.2	50.0
1977 - Labrador	4	8.3	18.4	60.0

Larch Casebearer, Coleophora laricella (Hbn.) — In 1977 population levels increased in eastern Newfoundland and caused severe browning of stands of tamarack in the Terra Nova National Park at Park Headquarters, Saltons Brook and Sandy Pond Junction. Severe browning also occurred on the Avalon Peninsula along the Logy Bay Road, Thorburn Road, Cochrane Pond and Newtown near St. John's.

Parasitism in the Terra Nova National Park infestations was low with only 4 parasites recovered from 134 casebearer larvae. However, in the infestation near St. John's an introduced parasite Agathis pumila (Ratz.) increased from 12% in 1976 to 19% in 1977 (Table 5).

Larch Needleworm, Zeiraphera improbana (Wlk.) — The needleworm infestation in the Newtown-Mount Pearl area continued for the third consecutive year. Severe defoliation, as high as 90%, was recorded on scattered trees and larval numbers averaged about 200 per tree sample.

Year	No. of collections	No. of larvae per tree sample		
		Min	Avg.	Max.
1977	6	0.3	31.1	230.0

Table 5.- 1977 larch casebearer counts

Location	Stand vigour	Stand defoliation	Avg. no. of cases per branch sample
Newtown	M	M	8.7
Cochrane Pond Provincial Park	M	M	8.8
Cobblers Brook	V	T	0.3
Sandy Pond Junction	U	S	5.5
1.9 km W. of T.N.N.P. Headquarters	M	M	6.3
0.8 km W. of Saltons Brook	M	S	10.8
6.4 km S. of Fischells River	M	T	0.4

Stand vigour:

U = unthrifty
M = moderately vigorous
V = vigorous

Stand defoliation:

T = trace
M = moderate
S = severe

European Pine Sawfly, Neodiprion sertifier (Geoff.) — High population levels of this accidentally introduced sawfly caused varying degrees of damage to ornamental pines in the St. John's area. Approximately 1100 pupal parasites, Pleolophus basizonus Crav. were introduced from Ontario and released in a pine plantation near Windsor Lake. Specimens of this parasite were collected in the fall from soil samples from the release area.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1977	2	30.0	40.0	50.0

Rusty Tussock Moth, Orgyia antiqua (L.) — Population levels increased throughout the Island. In eastern Newfoundland small infestations were recorded at Bread Cove Brook and Dunphy's Pond Road areas of the Terra Nova National Park and between St. Phillips and Bauline areas on the Avalon Peninsula. The highest larval numbers, 27 per tree sample, were recorded at Bread Cove Brook. In western Newfoundland larvae were collected throughout the Baie Verte Peninsula. An average of 16.7 larvae per tree sample occurred at the junction of Seal Cove and Wild Cove roads.

Defoliation of roadside trees and shrubs throughout the Peninsula was estimated at 10% near the Seal Cove-Wild Cove Junction and 75-100% along the LaScie and Nippers Harbour roads.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1977 - Island	10	0.3	6.5	50.0

Birch Casebearer, Coleophora fuscedinella (Zell.) — During 1977, population levels of the casebearer increased and the outbreak was the most widespread and severe ever recorded on the Island. The outbreak extended from Port aux Basques to Cow Head and east to Trinity Bay. No appreciable damage was recorded on the Avalon or Burin peninsulas although scattered ornamental trees were infested in some areas of St. John's. This infestation was probably introduced to the city by transplanted trees.

Parasites of the species Campoplex and Apanteles were released in 1974 and 1975 from sites near Mint Brook, Badger and White River Road. Although native parasites were common, there were no recoveries from the two introduced species.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1977 - Island	84	0.3	17.4	130.0

Large Aspen Tortrix, Choristoneura conflictana (Wlk.) and Poplar Leaf Roller, Anacampsis innoculella Zell. — Larval numbers of the tortrix have declined in the past year in central Newfoundland. However, the high numbers and combined feeding with the leaf roller caused moderate to severe damage throughout the Exploits Valley Watershed between Millertown and Botwood. In western Newfoundland light to moderate damage of aspen was recorded from Springdale to Birchy Dam in the Upper Humber Watershed. In Labrador the tortrix was recorded in low numbers for the first time along the Churchill Road near Goose Bay.

Year	No. of collections	No. of larvae per tree sample		
		Min	Avg.	Max.
1977 - Island	11	0.3	3.7	6.6
1977 - Labrador	2	1.0	5.5	10.0

OTHER NOTEWORTHY INSECTS

Species	Host(s)	Locality	Avg. per tree sample	No. of collections
Acronicta americana (Harr.) American dagger moth	tA	Jct. T.C.H. & Twin Lakes Rd.	0.3	1
Adoxus obscurus (Linn.) Western grape rootworm	W, dogwood	24.0 km S.W. Badger, Goose Bay	18.5	2
Agriotes sp. A click beetle	bF	2.9 km N. Wing's Pt.	0.3	1
Agrochola lota (Clerck) A cutworm	W	Clarke's Beach, Spaniard's Bay	4.5	2
Anomogyna elimata (Guen.) Chamelon caterpillar	bS	Jonathan's Pond Prov. Park	0.3	1
Anoplonyx luteipes (Cress.) Marlatt's larch sawfly	tL	Bauline Line, Placentia, Jct. of T.C.H. & Salmonier Line	1.7	3
Archips cerasivoranus (Fitch) Uglynest caterpillar	wB, Sal, choke cherry	Flat Bay Bk. Rd., Jct. T.C.H. & Flat Bay Bk., Flat Bay Bk. Bridge	50.0	4
Archips myricanus McD. A leafroller	rM	6.4 km S. South Bk.	6.0	1
Archips rosanus (Linn.) European leafroller	wB, rM, Sal Pch, aMo	Flat Bay Bk. Bridge, Robinson's Rd., Stephenville, Wild Cove Prov. Park, Heatherton Rd., Pasadena	2.6	7
Campaea perlata (Guen.) Fringed looper	wB	Thorburn Lake Prov. Park, Churchill Rd. (km 4.6)	0.3	2
Caripeta divisata Wlk. Gray spruce looper	bF, bS	Newtown, Witless Bay Line	0.3	2
Choristoneura rosaceana (Harr.) Obliquebanded leaf roller	rM, choke cherry	Barachois Prov. Park, Flat Bay Bk. Rd.	2.5	2

Cont'd ...

OTHER NOTEWORTHY INSECTS - Continued

Species	Host(s)	Locality	Avg. per tree sample	No. of collections
Chrysomela falsa Brown Willow leaf beetle	bPo	Goose River Bridge	10.0	1
Chrysomela mainensis mainensis Bech. Alder leaf beetle	wB, Sal dogwood	Bread Cove Bk., Southwest Bk., (TNNP), Northern Arm, Loon Bay, 5.3 km E. Baie Verte Jct., West Branch (Sandy Lake Rd.), Flat Bay Bk. Bridge (T.C.H.), District 109	10.7	14
Compsolechia niveopulvella Chamb. Poplar leaf roller	tA	Square Pond Prov. Park, Southwest River, Cobbler's Bk., Pilley's Island Causeay, 8.3 km E. Badger, 12.3 km S.W. Badger, St. Fintan's, Mud Lake.	11.9	9
Ctenicera appropinquans (Rand.) A click beetle	bF	3.2 km W. of Gate (Terra Nova Rd.)	0.3	1
Ctenicera nitidula Lec. A click beetle	bF, wB	Trinity Jct., Shoal Harbour, Twin Lakes Rd., 3.5 km E. Birchy Narrows	0.3	4
Ctenicera triundulata (Rand.) Three-spotted click beetle	bF, bS	Twin Lakes Rd., Junction Bk., Howley Rd., 8.0 km E. Hampden Jct.	1.2	4
Dendroides concolor Newn. Fire-coloured beetle	bF	Jct. T.C.H. & Salmonier Line, Camp 33 Rd. (Grand Lake)	0.2	2
Depressaria pastinacella (Dup.) Parsnip webworm	Wild parsnip	Tucker's Bk. (GMNP), North Lake Rd.	5.5	2

Cont'd ...

OTHER NOTEWORTHY INSECTS - Continued

Species	Host(s)	Locality	Avg. per tree sample	No. of collections
Diprion hercyniae (Htg.) European spruce sawfly	wS, bS	District 101, Creston North, Indian Bay, 14.2 km E. Baie Verte Jct., St. Teresa's Rd., Old Man's Pond, Southwest Bk. Rd., Northern Hr., Tucker's Bk., Chain Lakes Rd., Stuckless Pond Rd., P.S. Plots #34 & 49	0.9	17
Epinotia sp. A micro moth	Sal	Holyrood Pond Prov. Park, Carbonear	7.8	2
Eupithecia sp. Brown spruce looper	bF, wB, tL	Avalon Peninsula, Serpentine Lake Rd., Logging School Rd., Corner Brook Lake Rd., Glenburnie, Deadwater Bk., McKenzies Bk., North Lake Rd., Roddickton Rd.	1.4	21
Fenusa dohrnii (Tischb.) European alder leafminer	Sal	Swift Current, Gander, N.W. Gander River Rd., Trout River, throughout District 106	10.0	13
Fenusa pusilla (Lep.) Birch leafminer	wB	Swift Current, T.N.N. Park, Mint Bk., N.W. Gander River Rd., Island Pond, Rocky Hr. Rd., Goose Bay, throughout Districts 106, 108 & 109	13.6	50
Feralia jocosa (Guen.) Red-marked caterpillar	bF, wS, bS	Avalon Peninsula, Sandy Hr. River, St. Teresa's Rd., Codroy Pond, Old Man's Pond, North Lake Rd., Sheffield Lake, Stuckless Pond Rd.	0.4	14
Filatima demissae Keif. A leafroller	tA	Howley Rd.	5.0	1

Cont'd ...

OTHER NOTEWORTHY INSECTS - Continued

Species	Host(s)	Locality	Avg. per tree sample	No. of collections
Griselda radicana Wlshm. Red-striped spruce shoot moth	bF, wS	Avalon Peninsula	0.6	9
Halisodota maculata (Harr.) Spotted tussock moth	Sal	Flatwater Pond Prov. Park	2.0	1
Hedia variegana (Hbn.) Green budworm	Pch	Deer Lake	15.0	1
Hylobius sp. Root collar weevil	bF	16.3 km S.W. Badger, Goose Arm Rd.	0.3	2
Hypagyrtis piniata (Pack.) Pine looper	bF	Lady Slipper Rd., Crabbes River Prov. Park, Crescent Lake Rd., Deadwater Bk., 3.2 km W. Little Bonne Bay Pond	0.2	5
Hyphantria cunea (Drury) Fall webworm	Sal	White's Rd.	83.3	1
Lexis bicolor (Grote) Smoky moth	tA	Mud Lake	0.3	1
Limenitis arthemis (Drury) White admiral	tA, yB	Flat Bay Rd., St. Fintans	1.0	2
Lithomoia solidaginis Hbn. Owlet moth	W	1.8 km S. Random Island Causeway	1.0	1
Melanophila fulvoguttata (Harr.) Hemlock borer	bF, bS	Jack's Pond Prov. Park, 3.2 km W. Springdale	0.3	2
Mindarus abietinus Koch Balsam twig aphid	bF	Avalon Peninsula, Northwest River Rd.	13.8	6
Monochamus scutellatus (Say) Whitespotted sawyer	bF	Burnt Berry Bk. Rd.	0.3	1

Cont'd ...

OTHER NOTEWORTHY INSECTS - Continued

Species	Host(s)	Locality	Avg. per tree sample	No. of collections
Nadata gibbosa (J.E. Smith) Green oak caterpillar	W	New Harbour, LaManche Prov. Park	1.0	2
Nematus limbatus (Cress.) Willow sawfly	W	North Lake Rd., Northern Hr. Stuckless Pond Rd., Sop's Arm Rd., Churchill Rd.	27.5	7
Nematus sp. A willow sawfly	W, wB, Sal, tA	New Harbour, Butterpot Prov. Park, Gander, Grand Lake Rd., Northwest River Rd.	3.3	5
Neodiprion abietis complex Balsam fir sawfly	bF	Little Falls, Green Point, Roddickton Rd, Conche Rd., Zinc Mine Rd., District 112	0.6	10
Nepytia canosaria (Wlk.) False hemlock looper	bF	Avalon Peninsula, Jct. Goose Arm & North Lake Rds., Stephenville, Rocky Hr. Pond, 6.4 km N. Sally's Cove, Barter's Bk.	0.5	27
Neurotoma inconspicua (Nort.) Plum webspinning sawfly	Pch	Goose Bay Military Reserve, Churchill Rd.	57.5	3
Nycteola cinereana N. & D. Poplar leaf tier	W	Gander, West Branch (Sandy Lake Rd.)	8.8	2
Nyctobia limitaria (Wlk.) Green balsam looper	bF	Avalon Peninsula, 1.6 km E. Michael's Hr., Lady Slipper Rd., Serpentine Rd., District 107, Bonne Bay Rd., Glenburnie, Wolf Hill (Birchy Lake)	0.6	21
Nymphalis antiopa (L.) Mourningcloak butterfly	W	Churchill Rd.	12.0	1
Pachyta lamed Linn. A longhorned borer	bS	Grand Lake Rd.	0.3	1

Cont'd ...

OTHER NOTEWORTHY INSECTS - Continued

Species	Host(s)	Locality	Avg. per tree sample	No. of collections
Papaipema pterisii Bird. A stalk borer	Wild parsnip	Goose Arm Rd., Tucker's Bk. (GMNP)	1.2	2
Papilio sp. A tiger swallowtail	Ash	Rocky Hr. Pond	1.0	1
Parorgyia plagiata (Wlk.) Pine tussock moth	bF	3.2 km E. New Harbour, Crescent Lake Rd., Groves Pt.	0.4	3
Phratora purpurea purpurea Brown Aspen leaf beetle	tA, Ash	Jct. T.C.H. & Twin Lakes Rd., Jct. Goose Arm & Snug Hr. Rds., Sheffield Lake	0.6	3
Phyllocnistis populiella Chamb. Aspen leafminer	tA, bPo	Highlands River, Lomond, Grand Lake Rd.	6.7	3
Pikonema dimmockii (Cress.) Greenheaded spruce sawfly	bS, wS	Newtown, LaManche Prov. Park, Witless Bay Line, Southwest River, Northern Hr., Tucker's Bk. (GMNP)	0.7	6
Pissodes dubius Rand. Balsam bark weevil	bF	Catalina Rd.	0.3	1
Pissodes sp. A weevil	bF	Goose River Bridge	0.3	1
Podabrus sp. A soldier beetle	wB, tA, bF, tL	Jct. T.C.H. & Salmonier Line, Elliott's Cove, 3.5 km E. Birchy Narrows, Deadwater Bk.	0.3	4
Pristiphora geniculata (Htg.) Mountain ash sawfly	aMo	Southwest Arm, David Smallwood Mem. Prov. Park, Bonne Bay Rd., South Bk. Valley, Doucer's Bk., 6.4 km N. Baie Verte, Jct. Seal Cove & Wild Cove Rds., throughout Districts 104, 106 & 110	21.9	25

Cont'd ...

OTHER NOTEWORTHY INSECTS - Concluded

Species	Host(s)	Locality	Avg. per tree sample	No. of collections
Pristiphora lena K. Little spruce sawfly	bS	Southwest Bk. Rd.	0.3	1
Protoboarmia porcelaria indicataria (Wlk.) Dotted line looper	bF, wB	12.8 km E. Bay D'Espoir Rd., Camp 180 Rd. (Jeffery's), Thorburn Lake Prov. Park	0.3	3
Rhantus sp. A beetle	moM	Stock Cove	0.3	1
Sciaphila duplex Wlshm. Poplar leafroller	tA	Mummichog Prov. Park	3.0	1
Semiothisa sp. A looper	bF, tL	Avalon Peninsula, Pinchgut Lake Rd., Crabbes River Rd., Zinc Mine Rd., Roddickton Rd.	0.3	9
Solenobia walshella Clem. A bagworm	bF, bS	Burnt Berry Bk. Rd., Main Dam Rd.	2.1	3
Stilpnotia salicis (Linn.) Satin moth	sP	Clarke's Beach, Spaniard's Bay, Clarenville, Lomond, Squires Mem. Prov. Park, 8.0 km W. Hampden Jct.	26.0	7
Syneta sp. A leaf beetle	wB, wS	Shoal Harbour, 3.2 km W. Springdale	0.3	2
Syngrapha alias (Ottol.) Spruce climbing cutworm	bF, bS, W	Cochrane Pond Prov. Park, Clarenville, Eastport, Southwest Arm, Serpentine Lake Rd., Robinson's River Rd., Corner Brook	0.9	7
Zeiraphera canadensis Mut. & Free. Spruce bud moth	wS, bS	Windsor, Lake, Hodgewater Line, Jonathan's Pond Prov. Park, Cook's Bk.	0.5	4
Zeiraphera fortunana Kft. Yellow spruce budworm	wS	Cook's Bk.	0.3	1

IMPORTANT FOREST DISEASES

Broom Rusts of Conifers — Broom rust of balsam fir caused by Melampsorella caryophyllacearum Schroet., and of black spruce, caused by Chrysomyxa arctostaphyli Diet., were common throughout the Island for the past 3 years and their incidence was moderate to severe. In 1977, additional infections were observed as scattered patches on the Avalon, Burin and Bonavista peninsulas, along the Salmonier Line and near Gander and Carmanville. Up to 35% of the trees were infected at some locations, but no tree mortality appeared to be associated with the pathogens.

Witches' Broom of Black Spruce — Witches' broom of black spruce, caused by dwarf mistletoe, Arceuthobium pusillum Peck, continued to be a serious disease problem for the past few years in wet and low-lying areas from Trout Brook to Crabbes River in western Newfoundland. The incidence of the disease in these areas examined this year varied from moderate to high, with the highest percent infection and tree mortality being 85 and 15% respectively. An average of 10 brooms per tree were found, although the maximum number of brooms recorded on a tree were 40. In several cases the infection was very old, the oldest broom observed was 41 years old.

Stem and Branch Cankers of Lombardy Poplar, Dothichiza populea Sacc. & Briard — This accidentally introduced canker continued to be the most important disease in residential areas on the Island. Several new infections were recorded in the Baie Verte, Springdale and St. John's areas. The incidence of infection was about 35% and tree mortality 15%. In the Corner Brook area tree mortality increased to 40% along city streets.

Ink Spot of Trembling Aspen, Ciborinia whetzellii (Seav.) Seaver — A moderate to high incidence of this disease continued in a 5 km area along the Churchill Road near Goose Bay for the third consecutive year. Approximately 80% browning of foliage was recorded throughout the area. The infestation near McIsaacs Brook in western Newfoundland terminated in 1977.

Rust Gall, Gymnosporangium cornutum Arth. ex Kern — Rust galls of mountain ash were severe in some areas of central Newfoundland and on the Burin and Avalon peninsulas in eastern Newfoundland. The incidence of infection near Badger and the Beothuk Provincial Park was low, affecting about 10-20% of the foliage at each location. A very severe infection occurred on about 30 trees at Salmon Cove Sands; approximately 90% of the foliage was affected. Similar infections occurred along the Witless Bay Line in the vicinity of Country Pond.

Winter Drying — This condition was common on the Avalon Peninsula again this year. Reddening of 50% of the foliage of balsam fir was evident in exposed areas between St. Catherines and O'Donnells and on roadside stands near Riverhead. Between 30-50% damage occurred on windswept hillsides and open areas from Dunville to Point Verde and near Freshwater and Placentia. Several species of ornamental trees were also affected in communities in these areas.

Pine plantations on Tilton Barrens on the Avalon Peninsula were also affected. About 50% of Scots pine foliage was damaged in the Windsor Lake area.

Frost Damage — The occurrence of frost damage on balsam fir and black spruce was very common throughout the Island. In eastern Newfoundland a moderate incidence was recorded in balsam fir and black spruce regeneration along the Trans Canada Highway right-of-way in the Terra Nova National Park. Approximately 50% of the current growth was affected near Cobbler's Brook and near Sandy Pond junction with the Trans Canada Highway. In central Newfoundland a low to moderate incidence was recorded near Millertown, Exploits Dam and the junction of the Sandy Lake-West Branch roads. A low incidence also occurred on Sitka spruce in the plantation at Bakers Steady on Sandy Brook. In western Newfoundland an estimated 25% of the current growth was killed in a 0.5 ha area of balsam fir regeneration near McIsaacs Brook. Light damage also occurred along the Bonne Bay Road and in the Pinchgut Lake-Gull Pond Road areas.

OTHER NOTEWORTHY DISEASES

Organism and Disease	Host(s)	Locality	Remarks
Chrysomyxa arctostaphyli Diet. Broom rust	Spruce, black	Carmanville	Low incidence
Chrysomyxa ledicola Lagerh. Needle rust	Spruce, black	Trout River	High incidence
Ciborinia whetzelii (Seav.) Seav. Ink spot	Aspen, trembling	6.4 km W. McIsaac's Bk. Churchill Rd., Radio Tower Rd.	Low to high incidence
Coccomyces hiemalis Higgins Shot hole	Cherry, pin	3.4 km S. T.C.H. (Bay D'Espoir Rd.)	Low incidence
Cytospora chrysosperma (Pers.) Fr. Canker	Poplar, balsam	Freshwater	High incidence on few ornamentals
Cytospora salicis (Cda.) Rabh. Canker	Willow	Freshwater	High incidence on few ornamentals
Frost damage	Cherry, pin	Robinson's River Rd., Bonne Bay Rd., 8.0 km S. Exploits Dam, 6.4 km S. Exploits Dam, Millertown, Baker's Steady, West Branch Rd., Witless Bay Line, T.N.N. Park, McIsaac's Bk., Sop's Arm Rd.	Low to moderate incidence
Gloeosporium apocryptum Ell. & Ev. Large leaf spot	Maple, mountain	McIsaac's Bk., 3.5 km E. Birchy Narrows, Northern Arm	Trace to moderate incidence
Gymnosporangium claviceps (Cke. & Pk.) Cke. & Pk. Quince rust	Serviceberry	Millertown	Low incidence

Cont'd ...

OTHER NOTEWORTHY DISEASES - Continued

Organism and Disease	Host(s)	Locality	Remarks
Gymnosporangium cornutum Arth. ex Kern Rust gall on leaves	Ash, American mountain	Badger, Beothuck Prov. Park, Southwest Arm (Burin), Sandy Hr. River	Low incidence
Heat injury	Larch	Freshwater	Low incidence on few ornamentals
Isthmiella crepidiformis (Darker) Darker Needle cast	Spruce, black	Millertown	Low incidence
Late spring leaf scorch	Cherry, pin	3.4 km S. T.C.H. (Bay D'Espoir Rd.)	Low incidence
Lophodermium pinastri (Schrad. ex Hook.) Chev. Needle cast	Pine, Scots	Windsor Lake, Tilton Barrens, Freshwater	Moderate to high
Melampsorella caryophyllacearum Schroet. Yellow witches'-broom	Fir, balsam	Whelan's Pond Rd.	Low incidence
Mycosphaerella sp. Leaf spot	Aspen, trembling Maple, red Fireweed	4.2 km W. Horwood Jct., Deadwater Bk., Radio Tower Rd. (Goose Bay)	Low to moderate incidence
Phyllosticta minima (Berk. & Curt.) Underw. & Earle Purple eye spot	Ash, American mountain Maple, red and mountain	Rocky Hr. Pond, Lady Slipper Rd., C.F.S. Nursery (Pasadena), Kings Cove, Square Pond Prov. Park, Freshwater Pond Prov. Park	Low to moderate incidence

Cont'd ...

OTHER NOTEWORTHY DISEASES - Concluded

Organism and Disease	Host(s)	Locality	Remarks
Pollacia radiosa (Lib.) Bald. & Cif. Leaf and shoot blight	Aspen, trembling	3.5 km E. Birchy Narrows, Cobblers Bk., Southwest River, Buchans Rd., West Branch Rd., Roberts Arm Rd.	Trace to low incidence
Pucciniastrum epilobii Otth Needle rust	Fir, balsan	Marystown, Deadwater Bk., Sop's Arm Rd.	Low to moderate incidence.
Rehmiellopsis balsameae Waterman Tip blight	Fir, balsam	McIsaac's Bk.	Low incidence
Roadside damage	Alder, speckled	2.9 km W. Gull Bridge Mine Rd.	Moderate incidence
Septoria betulae (Lib.) West Leaf spot	Birch, white	Bonne Bay Rd.	Low incidence
Taphrina sp. Leaf blister	Aspen, trembling	Churchill Rd.	High incidence
Winter drying	Fir, balsam Pine, eastern white & Scots	Freshwater, Dunville Riverhead (Avalon), St. Catherines, O'Donnell's, 3.2 km N. O'Donnell's, Lake St. John, Windsor Lake	Low to moderate incidence

TREE PEST EXTENSION SERVICE REPORT, 1977

Monitoring the insects and diseases of ornamental trees and shrubs in urban centres of Newfoundland and recommending appropriate control measures are the prinicpal functions of the tree pest extension service. During 1977 numerous requests were received by the Newfoundland Forest Research Centre concerning tree and shrub selection, planting and maintenance and pest control.

In 1977 the spruce budworm outbreak spread to the eastern Avalon Peninsula and in July when defoliation became visible, the demand for information pertaining to the control of this insect increased considerably. The general public was informed of the control measures necessary to protect valuable ornamental greenery through the distribution of pamphlets, via the media and by telephone answering service. A television program was also produced which emphasized the necessity of early detection and correct identification if recommended control measures are to be effective. Appropriate precautions to be taken when applying insecticides were also described.

Cooperation from the Forestry Branch, Newfoundland Department of Forestry and Agriculture, was again received and liaison was maintained with the Corner Brook, Gander, and St. John's Regional Offices. Many insect and disease samples were received on a Regional and Unit basis with assistance provided when necessary by personnel from these offices.

A spruce budworm egg-mass survey was again carried out in private and municipal parks throughout the Province. An analysis of these samples showed a decrease in population levels from the 1976 conditions in parks located in western Newfoundland. Other additional services provided were as follows; softwood seedlings and technical services were provided to the town of St. Lawrence (establishment of a tree planting program), and to Castle Hill Historic Site, Placentia (program to reforest barren areas). Advice and laboratory services were also provided to the Department of Transportation and Communications regarding problems experienced when applying the herbicide Tordon.

The major insect pests recorded during 1977 are as follows:

The Spruce Budworm, Choristoneura fumiferana (Clem.) — The present outbreak of spruce budworm that is ravaging the major forested areas of the Province also caused extensive foliar damage to ornamental softwood shade trees. Defoliation was moderate in Corner Brook and Grand Falls, and severe in Gander, Clarenville, Mount Pearl and St. John's.

The Satin Moth, Stilpnotia salicis (Linn.) — This insect continued to cause severe defoliation of ornamental poplars during 1977. Corner Brook and Stephenville experienced severe defoliation (75%-100%), and in Grand Falls, Clarenville, and St. John's it ranged from light to moderate (35%-65%). Some twig mortality was also recorded in several areas.

Birch Casebearer, Coleophora fuscedinella (Zell.) — Defoliation by the birch casebearer is now being experienced throughout most of the Province. Damage was recorded in all urban centres from Stephenville to St. John's. In central Newfoundland, (Grand Falls and Gander), severe defoliation was observed with 100% of the foliage destroyed in many instances.

White Pine Needleminer, Ocnerostoma strobivora Free. — This needle mining insect was first detected in the St. John's area in 1975. It has since spread to Rural St. John's, Mount Pearl, and west to Holyrood. Defoliation has been mainly observed on Jack & Scots pine and classified as light to moderate.

European Pine Sawfly, Neodiprion sertifier (Geoff.) — This sawfly an accidentally introduced pest of a wide variety of native and exotic pines continues to defoliate many of these ornamental trees in urban St. John's. Population levels for this insect appear to be on the increase with numerous localized pockets detected throughout this area. Defoliation ranged from light (10%-15%) to severe (70%-80%).

OTHER NOTEWORTHY INSECTS

Insect	Host(s)	Sample locality	Remarks
Acleris variana (Fern.) Blackheaded budworm	Black spruce White spruce Balsam fir	St. Phillips Paddy's Pond Mount Pearl St. John's	Localized pockets of moderate defoliation
Archips rosanus (L.) European leafroller	White ash Cherry sp.	St. John's	Defoliation moderate with mortality recorded in St. John's area
Blissus leucopterus (Say.) Chinch bug	Grasses	St. John's	Considerable damage by this insect was caused to lawns in the immediate vicinity of St. John's
Cerarteryx graminis (Linn.) Antler moth	Grasses	St. John's	Population high but very little damage to lawns observed
Compsolechia niveopulvella Cham. Poplar leafroller	Lombardy poplar Carolina poplar	Corner Brook Bishops Falls Grand Falls St. John's	Light defoliation
Croesia forskaleana Linn. Leafroller	White ash	St. John's	Defoliation - moderate
Cryptorhynchus lapathi (L.) Poplar and willow borer	Willow spp.	St. Georges Gander	Damage - light
Desmocerus palliatus (Forst.) Elder borer	Golden elder	St. John's	Considerable damage has been caused to elder sp. in the St. John's area by this insect. Damage during 1977 - light.

Cont'd ...

OTHER NOTEWORTHY INSECTS - Continued

Insect	Host(s)	Sample locality	Remarks
Ennomos subsignarius (Hbn.) Elm spanworm	White birch	Baie D'Espoir	Defoliation - moderate
Fenusa pusilla (Lep.) Birch leafminer	White birch	Corner Brook Gander, Grand Falls, St. John's	Light defoliation
Fenusa ulmi Sund. Elm leafminer	American elm	St. John's	Defoliation - light
Harpipteryx xylostella (Linn.) European honeysuckle leafroller	Hawthorne	St. John's	Defoliation - severe
Hedia variegana (Hbn.) Green budworm	Hawthorne	St. John's	Defoliation - moderate
Nymphalis antiopa (L.) Spiny elm caterpillar	Willow spp.	Corner Brook St. John's	Light defoliation
Ocnerostoma strobivora Free. White pine needleminer	Jack pine Scots pine	St. John's Foxtrap Seal Cove, C.B.	Defoliation - moderate
Orgyia antiqua (L.) Rusty tussock moth	Trembling aspen	St. Phillip's	Light defoliation
Pissodes sp. A weevil	Austrian pine	Mount Pearl	Some mortality observed

Cont'd ...

OTHER NOTEWORTHY INSECTS - Concluded

Insect	Host(s)	Sample locality	Remarks
Pristiphora geniculata (Htg.) Mountain ash sawfly	Showy mountain ash American mountain ash	St. John's Gander Corner Brook	Commonly found throughout Newfoundland. Defoliation - light.
Swammerdamia sp. Ermine moth	Hawthorne Cherry spp.	St. John's	Defoliation - moderate
Tipula paludosa Meigen European crane fly	Grasses	St. John's	Moderate damage caused to lawns throughout St. John's area.

APPENDIX I. Results of spruce budworm egg mass sampling 1977.

Plot location		No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
NEWFOUNDLAND					
Eastern					
1	Bay Bulls	2	0	L	Nil
1A	La Manche Prov. Park	2	0	L	"
1B	4.8 km S. Bay Bulls	2	0	M	"
2	Country Pond	2	0	L	"
2A	Tors Cove	3	189	L	L
2B	Bay Bulls	2	0	Nil	Nil
3	Bay Bulls Big Pond	1	575	M	S
3B	" " " "	2	37	L	L
4	Goulds	2	25	L	L
5	Cochrane Pond	2	0	L	Nil
6	Blackhead	2	0	L	"
7	Logy Bay	2	0	L	"
8	Torbay	2	0	L	"
9	Pouch Cove	2	17	S	L
10	Bauline	3	0	L	Nil
11	"	2	0	L	"
12	Bauline line	2	0	L	"
13	St. Phillips	2	0	L	"
13A	" "	2	0	L	"
14	St. Thomas	2	0	L	"
16	Paddy's Pond	2	50	M	L
18	6.4 km W. Paddy's Pond	2	0	L	Nil
19	Butterpot Prov. Park	2	20	L	L
20	6.4 km N. Holyrood	2	35	Nil	Nil
21	Hr. Main Pond	2	0	"	"
22	Southwest Pond	2	0	"	"
23	Jct. Prison Camp Rd.	2	0	"	"
24	6.4 km N.E. St. Catherines	2	0	L	"
25	St. Catherines	2	0	Nil	"
26	New Bridge	2	0	L	"
27	St. Catherines	2	0	Nil	"
28	Markland River	2	0	L	"
29	Argentia Access Rd.	2	0	L	"
30	" " "	2	21	L	L
31	Placentia	2	0	L	Nil

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
32	Dildo Pond	2	70	L	L
33	Dildo Arm	2	26	L	L
34	Hopeall	2	0	L	Nil
35	6.4 km S.W. Bay Roberts	2	68	Nil	L
36	Riverhead	2	0	L	Nil
37	3.2 km S. Carbonear	2	13	S	L
38	3.2 km N. Whiteway	3	266	Nil	L
39	Heart's Delight	2	0	L	Nil
40	Chapel Arm	2	25	L	L
41	" "	2	0	L	Nil
42	Kite Hill	1	705	S	S
43	Thornlea	1	3179	S	S
44	Bellevue	1	442	S	S
45	"	1	1606	S	S
46	Thornlea	1	976	S	S
47	Bellevue Beach	1	5080	S	S
48	Jack's Pond Prov. Park	1	1690	S	S
49	Goobies	1	1200	S	S
50	Hatchet Cove	1	611	S	S
51	St. Jones Within	3	774	S	S
52	Adeytown	1	1333	S	S
53	Random Island	1	759	S	S
54	Elliots Cove	1	486	S	S
55	Aspen Brook	2	15	S	L
56	Weybridge	1	341	S	S
57	Lady Cove	1	1084	S	S
58	Hickman's Hr.Jct.	2	50	L	L
59	Brittania	1	624	S	S
60	1.6 km E. Barton	1	597	S	S
61	5.6 km E. Monroe	1	1797	S	S
62	6.4 km N. Georges Bk.	1	1667	S	S
63	Bonavista	2	144	S	L
64	6.4 km S.E.Bonavista	1	738	S	S
65	12.8 km " "	2	38	Nil	L
66	Northern Pond	1	1028	S	S
67	Portland Rd.	1	556	S	S
68	Bonavista Hwy.	1	1666	M	S

APPENDIX I - Continued

Plot location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
69 Sweet Bay	3	886	S	S
69A Sweet Bay Rd.	2	72	Nil	L
70 Southern Bay	2	0	M	Nil
71 Summerville	3	969	S	S
72 Plate Cove	1	357	M	S
73 King's Cove Rd.	3	952	S	S
74 King's Cove	1	914	S	S
75 Port Rexton	3	3489	S	S
76 " "	1	1439	S	S
76A " "	2	14	O	L
77 " "	3	2348	S	S
78 Knight's Cove	3	2351	S	S
79 " "	3	1049	M	S
80 Catalina	2	682	M	S
81 Newman's Cove	1	1751	S	S
82 Bread Cove Brook (TNNP)	1	1304	M	S
83 3.2 km S. Ochre Pit Hill (TNNP)	1	629	S	S
84 Bread Cove	2	338	M	M
85 3.2 km E. Bread Cove (TNNP)	1	461	S	S
87 Fire Lookout (TNNP)	2	174	S	M
88 3.2 km N.W. Fire Lookout (TNNP)	2	138	S	L
89 3.2 km N. Fire Lookout (TNNP)	3	545	L	M
91 Clode Sound (TNNP)	2	0	S	Nil
92 Park Harbour Hill (TNNP)	3	1013	S	S
93 Clode Sound (TNNP)	2	0	M	Nil
94 South Broad Cove (TNNP)	1	636	S	S
95 Mt. Stamford (TNNP)	2	0	S	Nil
96 " " "	3	557	S	M
97 Jct. T.C.H. & Park Headquarters	3	314	S	L
98 Saltons Brook (TNNP)	1	1098	S	S
99 Southwest Arm "	2	67	S	L
100 Bluehill Pond "	3	509	S	M

APPENDIX I - Continued

Plot location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
101 Long Pond North (TNNP)	1	755	S	S
102 Swale Island (TNNP)	1	715	S	S
103 Matchim's Cove (TNNP)	3	2500	S	S
104 Green Hill Ponds (TNNP)	3	695	S	S
105 Broad Cove (TNNP)	2	0	S	Nil
106 Little Barasway	2	0	L	"
107 Great Barasway	2	0	L	"
108 Jct. Garden Cove Rd.	3	787	L	S
109 Piper's Hole River	3	775	M	S
110 Mooring Cove	2	8	Nil	L
111 Marystown	2	0	"	Nil
112 "	2	0	L	"
113 Garnish Pond Rd.	2	0	Nil	"
114 Creston North	2	82	L	L
115 Winterland Jct.	2	0	Nil	Nil
116 Lewins Cove	2	0	"	"
117 Epworth Jct.	2	0	"	"
118 Frenchman's Cove	2	0	"	"
126 11.2 km E. George's Pond	3	306	S	L
127 8.0 km E. George's Pond	3	330	S	M
128 Thorburn Lake	3	176	L	Nil
129 Port Blandford	2	0	S	"
130 8.0 km W. Bunyan's Cove	1	530	S	S
131 Bunyan's Cove	3	318	S	M
132 Northwest Arm (TNNP)	2	80	S	L
133 South Boundary "	1	1140	S	S
134 Jct. Sandy Pond Rd. (TNNP)	1	1167	S	S
135 Tidewater (TNNP)	1	1000	S	S
136 Charlottetown	2	1199	S	S
137 Charlottetown Jct. (TNNP)	2	2500	S	S
138 3.2 km S. Dunphy's Pond Rd. (TNNP)	3	333	S	M
139 Dunphy's Pond (TNNP)	2	67	S	L
140 Terra Nova Bk. "	2	0	L	Nil

APPENDIX I - Continued

Plot location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
141 Pine Hill Pond (TNNP)	1	601	S	S
142 Terra Nova Rd.	3	280	M	L
143 Chain Pond	1	687	S	S
144 Terra Nova Lake	2	43	S	L
145 Northwest Pond	1	400	S	S
146 Terra Nova Rd.	1	1000	S	S
147 " " "	2	634	S	S
148 " " "	1	800	S	S
149 Lake St. John	1	2809	S	S
150 4.8 km S. New Pond	3	430	S	M
151 Mollyguajeck Lake	1	618	S	S
152 Larry's Pond	2	100	S	L
153 " "	1	562	S	S
154 Lake St. John	1	428	S	S
155 Deer Pond	2	118	S	L
156 " "	1	1444	S	S
157 " "	1	560	S	S
158 Newton Lake	2	31	L	L
159 Deer Pond area	2	22	L	L
160 4.8 km S. Southwest Pond	1	412	S	S
161 Triton Brook	2	0	Nil	Nil
162 " "	3	541	M	M
163 " "	2	40	S	L
164 Deer Pond	1	743	S	S
165 Triton Brook	2	35	L	L
166 " "	1	1360	S	S
167 Riverhead Brook	3	660	L	S
168 Deadwolf Pond	2	42	L	L
169 Gambo Pond	1	450	S	S
170 " "	3	987	S	S
171 " "	2	803	S	S
172 North Pond	3	377	S	M
173 Mason's Pond	1	654	S	S
174 Gambo	1	733	S	S
175 Glovertown	1	1759	S	S
Average		412		

APPENDIX I - Continued

Plot location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
Central				
119 Conne River	2	203	S	M
120 6.4 km N. Head Bay D'Espoir	2	93	S	L
121 Milltown	2	207	S	M
122 Head Bay D'Espoir	2	190	M	L
123 4.8 km N. St. Veronicas	3	518	M	M
124 St. Joseph's Cove	2	736	S	S
125 Swanger Cove	1	519	S	S
126 Dark Cove	3	1732	S	S
177 Lower Dark Cove	1	2178	S	L
178 Square Pond	2	41	S	L
179 6.4 km E. of Benton Jct.	2	103	S	L
180 Benton Jct.	3	1775	L	S
181 Soulis Pond	3	1575	L	S
182 " "	1	1429	M	S
183 " "	1	769	S	S
184 Home Pond	1	425	S	S
185 4.0 km S. Deadman's Pond	3	642	S	M
186 Rodney Pond	2	52	M	L
187 " "	3	608	S	M
187A " "	3	335	S	M
188 Joe Batt's Pond	1	1164	S	S
189 Glenwood	2	569	S	S
190 Gander Lake	3	2708	S	S
191 " "	3	1630	L	S
192 N.W. Gander River	1	769	S	S
193 " " "	2	41	M	L
194 " " "	3	1315	L	S
194A Clarkes Bk.	2	0	S	Nil
195 Winter Bk.	3	192	L	L
196 S.W. Gander River	3	842	S	S
197 " " "	3	629	S	M
198 Little Dead Wolf Pond	3	915	S	S
199 Hunt's Pond	3	771	S	S
200 Hunt's Bk.	2	101	S	L

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
200A	S.W. Gander River	3	743	S	S
201	" " "	3	308	S	L
202	Dead Wolf Brook	2	49	M	L
203	Watcher's Bk.	2	0	L	Nil
204	Caribou Lake	2	89	M	L
205	S.W. Gander River	3	3337	S	S
205A	Winter Brook	3	675	L	S
206	S.W. Gander River	3	264	L	L
208	N.W. Gander River	3	672	S	M
208A	" " "	2	129	L	L
209	" " "	2	0	L	Nil
210	S.W. Gander River	1	364	M	S
211	Great Gull River	2	0	L	Nil
212	Third Berry Hill Pond	2	0	L	"
213	N.W. Gander River	2	0	L	"
214	" " "	2	67	L	L
215	5.0 km N. Rattling Pond	2	130	M	L
216	Webber Pond	2	119	M	L
217	6.4 km E. Crowe Lake	2	53	M	L
218	Crowe Lake	2	0	L	Nil
219	8.0 km N. Crowe Lake	1	358	M	S
220	Burnt Lake	1	400	S	S
221	" "	2	123	S	L
222	Frozen Ocean Lake	2	101	L	L
223	Tote Hill	2	0	S	Nil
224	Bay D'Espoir Rd.	2	0	S	S
225	Miquel's Lake	3	1181	S	S
226	Bay D'Espoir Rd.	2	0	S	Nil
226A	" " "	2	0	L	"
227	" " "	2	26	S	L
228	" " "	3	401	S	M
229	Littl Gull Lake	3	101	S	L
230	Bay D'Espoir Rd.	3	1306	S	S
231	" " "	2	0	M	Nil
231A	" " "	2	92	Nil	L
232	" " "	2	933	S	S

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
233	Twillick Bk.	2	59	S	L
234	Great Rattling Bk.	2	26	M	L
235	North Great Rattling Brook	2	0	M	Nil
235A	" " "	2	0	Nil	"
236	Great Rattling Bk.	2	0	L	"
236A	North Great Rattling Brook	2	619	S	S
237	Great Rattling Bk.	2	0	M	Nil
237A	Miquel Hill	2	0	M	"
238	Miquels Lake	3	514	S	M
239	Great Rattling Bk.	2	0	S	Nil
240	Diversion Lake	2	0	Nil	"
241	Sandy Bk.	3	740	S	S
242	Diversion Lake	2	0	L	Nil
243	Grand Falls	3	258	L	L
244	Lemott's Lake	2	0	L	Nil
245	West Lake	1	597	S	S
246	Tom Joe Bk.	2	124	M	L
247	10.0 km W. Grand Falls	3	469	M	M
248	Aspen Bk.	2	110	S	L
248A	Leech Bk.	2	112	S	L
249	Jonathan's Pond Prov. Park	2	100	L	L
249A	Jonathan's Pond	2	0	S	Nil
250	Island Pond Bk.	3	788	S	S
251	Weirs Bk.	2	0	S	Nil
252	Gander River	1	735	S	S
253	Gander Bay Rd.	2	0	S	Nil
254	Weirs Pond	1	556	S	S
254A	Barry's Pond	2	63	S	L
255	Gander Bay	2	47	S	L
256	Beaver Hill	2	0	Nil	Nil
257	Carmanville	3	609	L	M
258	Ragged Hr. River	2	127	M	L
259	Dog Bay	1	991	S	S
260	Boyd's Cove	2	676	S	S
261	Chapel Island	1	433	M	S
262	Summerford	1	642	S	S
263	Chance Cove	1	577	S	S

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
264	8.0 km N. Birchy Bay	1	602	M	S
265	Birchy Bay	1	714	S	S
266	Duder Lake	1	600	S	S
267	Burnt Lake	3	285	L	L
268	" "	2	46	S	L
269	Bellman's Pond	2	49	M	L
270	Ten Mile Lake	3	393	S	M
271	Long Pond	3	609	S	S
272	South Pond	3	595	S	M
273	Brinks Pond	1	1388	S	S
274	Dans Pond	3	719	S	S
275	Salmon Pond	3	1075	S	S
276	" "	1	1339	S	S
277	Indian Pond	1	933	S	S
278	Southside	1	598	S	S
279	Campbellton	2	44	S	L
280	Newstead Rd.	3	409	S	M
281	Burnt Lake	1	889	S	S
282	Bear Lake	2	129	S	L
283	Jumpers Brook	2	137	S	L
284	Norris Arm	1	514	S	S
285	" "	1	1063	S	S
286	12.8 km S. Lewisporte	2	615	S	S
287	8.0 km S. Lewisporte	2	150	S	M
288	Norris Arm North	2	986	S	S
289	Brown's Arm	1	730	S	S
290	Laurenceton	2	0	S	Nil
291	Point of Bay	3	683	S	S
292	Indian Cove	2	1443	S	S
293	9.6 km S. Cottrell's Cove	2	57	L	L
294	Northern Arm	2	15	L	L
295	4.8 km N. Northern Arm	3	1234	S	S
296	Mill Pond	2	97	S	L
297	West Arm	2	1069	S	S
298	Mill Cove	2	15	L	L
299	Lewis Pond	1	1115	S	S
300	New Bay Rd.	2	64	S	L

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
301	4.8 km E. New Bay Pond	2	342	S	M
302	New Bay Pond	3	560	S	M
303	" " "	2	88	M	L
304	" " "	3	530	L	M
305	2.4 km N. Peter's River	3	658	L	M
306	9.6 km S. New Bay Pond	3	1170	S	S
307	Hodges Hill	1	1432	S	S
307A	Middleton Lake	2	648	S	S
307B	Mary Ann Lake	3	163	M	L
308	" " "	3	514	S	M
309	Moose Pond	2	0	S	Nil
310	Rocky Pond	2	885	S	S
310A	South Twin Lake	2	0	L	Nil
311	Mary Ann Lake	1	905	S	S
312	" " "	2	71	M	L
313	South Twin Lake	1	425	M	S
313A	" " "	2	134	M	L
314	Frozen Ocean Lake	3	471	M	M
315	South Twin Lake	2	38	M	L
316	Frozen Ocean Lake	2	787	S	S
317	South Twin Lake	3	345	S	M
318	" " "	3	1866	S	S
319	Seal Bay Bk.	3	2374	S	S
320	4.8 km S. Wild Bight	2	79	L	L
321	South Twin Lake	3	681	S	S
322	4.8 km S.W. Wild Bight	3	715	S	S
323	Mark's Lake	3	442	S	M
323A	" "	3	270	M	M
324	North Twin Lake	3	167	M	L
325	" " "	3	148	S	L
326	" " "	3	1001	M	S
327	" " "	1	485	M	S
328	" " "	2	201	S	M

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
328A	North Twin Lake	2	60	M	L
329	" " "	2	38	M	L
330	Sop's Lake	2	0	L	Nil
331	Kippen's Pond	2	0	L	"
332	Roberts Arm Rd.	3	429	S	M
333	Crescent Lake	1	420	S	S
334	Pilley's Island	2	49	M	L
340	6.4 km S. Badger	1	530	S	S
341	Buchans Rd.	1	444	L	S
342	Millertown Jct.Rd.	2	42	S	L
343	" " "	3	433	S	M
344	" " "	2	154	S	M
344A	Little Red Indian Pond	2	0	L	Nil
345	" " "	2	147	L	L
346	Buchans Rd.	3	642	M	M
346A	Hodges Hill	2	0	L	Nil
347	Buchans Rd.	3	1194	M	S
348	Badger Lookout	2	33	S	L
349	Pamehac Bk.	3	565	S	M
350	West Lake	2	0	S	Nil
351	Leonard's Lake	3	236	Nil	L
352	West Bk.	2	0	"	Nil
353	Sandy Lake	2	50	S	L
354	" "	3	2006	S	S
355	" "	3	161	Nil	L
356	Caledonia Bk. area	2	0	"	Nil
357	Tom Joe's Bk.	2	95	S	L
358	Noel Paul's Bk.	2	27	L	L
359	" " "	3	280	S	L
360	" " "	3	193	S	L
361	" " "	2	64	L	L
362	" " "	2	0	Nil	Nil
363	" " "	2	43	S	"
364	Noel Paul's Bk. area	3	719	S	S
365	" " "	3	433	S	M
366	Noel Paul's Bk.	3	305	S	L
367	" " "	2	126	M	L
368	Tally Pond	2	76	M	L

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
369	Tally Pond	2	988	L	S
370	9.6 km N.E. Tally Pond	2	0	Nil	Nil
371	" " " "	2	256	S	L
372	11.2 " " "	2	0	L	Nil
373	" " " "	2	30	S	L
374	Harpoon Bk.	2	134	S	L
375	Buchans Jct.	2	0	L	Nil
376	Millertown	3	624	S	M
377	Exploits Dam	1	542	S	S
378	Hungry Hill	3	355	S	M
379	Harpoon Bk. area	2	101	S	L
380	Harpoon Bk.	2	662	S	S
381	Harpoon Hill	1	519	S	S
382	Lake Ambrose	2	145	S	L
383	Lake Douglas	2	511	S	S
383A	Lake Ambrose	1	714	S	S
384	Lake Douglas	3	300	S	L
385	" "	2	142	S	L
386	Wilding Lake	3	198	S	L
387	Quinn Lake	2	0	Nil	Nil
388	Victoria River	1	480	S	S
389	Victoria River area	2	0	Nil	Nil
390	Quinn Lake	2	0	L	"
391	Rogerson Lake	3	737	M	S
392	Beaver Lake	3	434	S	M
393	Victoria River	2	60	M	L
394	Victoria River area	2	599	L	S
395	Red Indian Lake	3	293	L	L
396	" " "	2	0	L	Nil
397	" " "	2	0	S	"
398	" " "	2	43	S	L
399	" " "	2	57	L	L
400	" " "	3	401	L	M
401	" " "	2	126	L	L
402	Victoria River	2	0	L	Nil
403	Costigan Lake	2	0	Nil	"
404	Tulks Bk.	2	36	M	L
405	Lloyd's Lake	3	577	S	M
406	Red Indian Lake	2	0	L	Nil

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
407	Shanadithit Bk.	2	57	M	L
409	Victoria River	2	0	Nil	Nil
410	Victoria Lake	2	0	"	"
411	Lloyd's River area	2	0	"	"
412	Lloyd's River	2	0	"	"
413	Lloyd's Lake area	2	0	"	"
413A	Lloyd's Lake	2	21	L	L
414	Victoria Lake	2	0	Nil	Nil
415	Lloyd's Lake	3	603	S	M
415A	Lloyd's River	1	375	L	S
416	Lloyd's Lake area	3	162	M	L
417	Portage Lake	2	0	Nil	Nil
419	9.6 km W. Lloyd's Lake	2	20	L	L
452	Buchans Rd.	3	187	L	L
453	" "	2	0	S	Nil
454	Badger Bk.	2	0	S	"
454A	Lake Bond	2	100	S	L
455	Joe's Lake	2	52	S	L
456	Crooked Lake	2	96	L	L
456A	" "	2	40	S	L
457	Crooked Bog	2	117	L	L
458	Dawes Pond	2	39	L	L
459	" "	2	540	S	S
460	South Bk. (Halls Bay)	2	0	L	Nil
461	Little Glodes Pd.	2	117	L	L
462	Three Corner Pond	2	0	L	Nil
462A	Nutmeg Hill	2	102	L	L
463	Great Gull Lake	1	444	S	S
464	" " "	3	728	S	S
465	Burnt Pond	1	417	S	S
466	Great Gull Lake	2	663	S	S
466A	Rocky Pond	2	76	L	L
467	South Bk. (Halls Bay)	3	335	S	M
468	Rocky Pond	3	443	S	M
469	South Pond	2	37	M	L
469A	" "	3	695	S	S
470	Barney's Bk.	1	728	L	S
471	" "	2	46	M	L
472	West Bk.	2	0	S	Nil
472A	Burnt Berry Bk.	2	118	L	L

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
473	West Bk.	2	63	S	L
473A	" "	2	0	M	Nil
474	Burnt Berry Bk.	2	0	S	"
475	" " "	2	0	S	"
476	West Pond	3	814	S	S
477	Burnt Berry Bk.	2	88	S	L
478	" " "	2	0	L	Nil
479	" " "	3	331	S	M
480	" " "	3	691	S	S
481	Springdale	2	0	L	Nil
482	Jct. King's Point Rd.	2	135	M	L
483	Davis Pond	3	596	S	M
484	King's Point Rd.	2	0	M	Nil
485	11.2 km E. Baie Verte Jct.	2	0	S	"
486	Indian River	2	49	S	L
487	Gull Pond	2	28	M	** L
488	King's Point	2	115	S	L
489	Jackson's Cove Rd.	2	108	S	L
490	" " "	2	131	S	L
491	Middle Arm Ridge	2	25	L	L
456B	E. of Crooked Lake	2	0	L	Nil
Average			204		

Western

335	Jct. Woodstock Rd.	3	277	S	L
335A	Smith's Hr.	3	196	S	L
336	La Scie Rd.	2	0	S	Nil
337	Jct. Nipper's Hr. Rd.	1	611	S	S
338	Jct. Hr. Round Rd.	1	933	S	S
339	Jct. Tilt Cove Rd.	2	1559	S	S
408	Hinds Lake	2	0	L	Nil
408A	" "	2	141	S	L
408B	" "	3	205	Nil	L

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
418	Puddle Pond	2	0	Nil	Nil
420	Battle Pond	2	176	S	M
421	3.2 km W. Silver Pond	2	59	S	L
422	Little Barachois Bk.	2	111	Nil	L
422A	" " "	2	0	L	Nil
423	Little Barachois Bk. area	2	55	L	L
424	Southwest Bk.	2	43	S	L
425	" "	2	48	S	L
426	Little Grand Lake	2	51	M	L
427	Little Grand Lake area	2	29	Nil	L
428	Little Grand Lake	3	684	L	S
429	W. side of Grand Lake	2	0	L	Nil
430	Glover Island	2	0	Nil	"
431	" "	2	0	"	"
432	W. side of Grand Lake	2	0	"	"
433	Corner Brook Lake	2	0	"	"
434	" " "	2	0	"	"
435	" " "	2	0	L	"
436	8.0 km S. Pinchgut Lake	2	129	L	L
437	Pinchgut Lake	2	0	Nil	Nil
438	" "	2	0	L	"
439	Stag Lake	2	0	L	"
440	Pinchgut Lake	2	0	L	"
441	Lady Slipper Rd.	3	242	L	L
442	" " "	2	138	L	L
443	Corner Brook	2	0	Nil	Nil
444	Steady Brook Lake	2	0	"	"
445	Northern Hr. Rd.	2	0	L	"
446	South Bk. Valley Rd.	3	167	L	L
447	Island Pond	2	63	Nil	L
448	Grand Lake	2	0	"	Nil
449	South Bk. Valley Rd.	3	440	S	M

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
450	Irishtown	2	81	S	L
451	Summerside	2	0	S	Nil
492	8.0 km N.E. Gull Pond	2	32	L	L
493	Cross Country Pd.	2	123	L	L
494	Burlington Rd.	3	697	S	S
495	8.0 km N.W. Burlington	2	0	S	Nil
495A	East Brook	2	67	S	L
496	Burlington Rd.	2	802	S	S
496A	11.2 km N.W. Burlington	3	191	S	L
497	South Bk. (Baie Verte Pen.)	3	618	S	M
498	South West Bk. (Baie Verte Pen.)	1	511	S	S
499	South Bk. (Baie (Verte Pen.)	2	32	S	L
500	La Scie Rd.	3	374	S	M
501	Jct. Ming's Bight	2	0	L	Nil
502	Ming's Bight Rd.	2	73	L	L
503	4.8 km E. Baie Verte	2	45	S	L
504	La Scie Rd.	3	1422	S	S
505	Baie Verte Rd.	2	0	S	Nil
506	Jct. Seal Cove Rd.	2	0	L	"
507	6.4 km N. Baie Verte	2	33	L	L
508	6.4 km N.W. Baie Verte	2	0	S	Nil
509	Wild Cove Rd.	2	84	L	L
510	Jct. Wild Cove Rd.	3	340	L	M
511	Seal Cove	3	566	S	M
511A	Seal Cove Rd.	2	72	M	L
512	Southern Pond	2	0	S	Nil
513	Baie Verte Rd.	3	277	S	L
514	Gull Pond	2	0	L	Nil
515	East Pond	2	84	M	L
515A	Middle Arm Bk.	1	1061	S	S
516	Westport	2	0	L	Nil
516A	Western Arm	3	734	S	S
517	Pumbly Cove	2	0	S	Nil
518	Wild Cove Pond	2	0	Nil	"

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
519	4.8 km S.W. Gull Pond	2	0	L	Nil
521	Flatwater Pond	2	24	L	L
522	Wild Cove Pond	2	0	S	Nil
523	" " "	2	17	Nil	L
524	Micmac Lake	2	44	M	L
525	Black Lake	3	449	S	M
526	Indian Pond	3	336	S	M
527	Baie Verte Prov. Park	2	0	L	Nil
528	4.8 km W. Baie Verte Jct.	1	1200	S	S
529	Sheffield Lake	1	600	S	S
530	" "	2	133	Nil	L
531	" "	2	0	L	Nil
532	Birchy Lake	2	0	S	"
532A	Gillard's Lake	2	0	L	"
533	Birchy Lake	2	125	S	L
534	" "	3	531	M	M
534A	" "	3	308	M	L
535	Chain Lakes	3	405	L	M
535A	Birchy Lake	2	0	Nil	Nil
536	Chain Lakes	2	0	"	"
537	" "	2	0	L	"
538	Goose Brook	2	0	L	"
538A	Conical Hill	2	23	S	L
538B	Kittys Bk.	2	76	S	L
538C	4.0 km N.E. Kitty's Bk.	2	591	M	S
539	Hind's Bk.	2	0	Nil	Nil
539A	Blue Grass Bk.	1	350	L	S
540	Howley	2	0	L	Nil
541	Jct. Howley Rd. & T.C.H.	2	0	L	"
542	6.4 km E. of Howley	3	332	S	M
543	Sandy Lake	2	0	L	Nil
543A	Island Pond	1	414	S	S
544	6.4 km E. Big Falls	2	130	L	L
545	Big Falls	3	1032	L	S
547	Mary Ann Bk.	3	512	S	M

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
547A	Birchy Ridge	2	76	L	L
548	Crooked Feeder	2	66	M	L
549	" "	1	413	S	S
550	Junction Bk.	2	0	L	Nil
551	Upper Humber River	2	56	S	L
552	Cormack	3	283	S	L
553	1.6 km E. White River Rd.	2	0	M	Nil
553A	Adies Lake	2	21	M	L
554	Little Falls	2	118	S	L
555	6.4 km E. Adies Lake	3	330	S	M
555A	Birchy Ridge	2	0	Nil	Nil
556	Hampden Rd.	1	852	M	S
557	" "	2	0	S	Nil
557A	Hampden Jct.	3	400	M	M
558	Hampden Rd.	2	0	L	Nil
559	" "	2	25	S	L
560	" "	1	926	S	S
561	Sop's Arm Rd.	2	0	L	Nil
562	" " "	2	107	L	L
563	4.8 km W. Hampden	2	111	S	L
564	Sop's Arm Rd.	2	48	L	L
565	Birchy Basin	2	0	S	Nil
566	" "	3	371	L	M
566A	Adies River	1	400	M	S
567	Taylors Bk.	2	50	Nil	L
568	Sop's Arm Rd.	2	0	S	Nil
569	" " "	2	100	S	L
570	9.6 km N. Hampden	2	0	S	Nil
570A	11.2 km S. Sop's Arm	2	0	L	"
571	8.0 km S. Sop's Arm	2	0	S	"
572	Sop's Arm Rd.	2	40	S	L
573	" " "	2	0	S	Nil
574	Main River area	2	0	Nil	"
575	Main River	2	0	"	"
576	Sop's Arm	2	0	M	"

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
576A	4.8 km N. Sop's Arm	2	64	S	L
577	" " " "	2	0	S	Nil
578	Jackson's Arm	3	256	S	L
579	Great Coney Arm	2	36	S	L
580	9.6 km N.W. Sop's Arm	2	0	Nil	Nil
581	Main River area	2	20	M	L
583	St. Paul's Big Pond	2	0	L	L
584	Upper Humber	3	368	Nil	Nil
585	" " area	2	0	"	"
586	" "	2	0	"	"
587	" "	3	488	S	M
588	" "	2	1	Nil	L
589	Adies River	2	0	"	Nil
590	Adies Lake	1	493	S	S
590A	" "	2	37	L	L
591	Whites River	2	57	L	L
592	6.4 km W. Adies Lake	2	48	S	L
593	Bonne Bay Big Pond	2	105	S	L
594	Rocky Bk.	2	154	L	L
595	9.6 km N.W. Deer Lake	2	26	S	L
596	Goose Arm Rd.	2	0	L	Nil
597	" " "	2	0	M	"
598	" " "	1	444	S	S
599	Deer Lake	2	81	S	L
600	Little Harbour	2	45	S	L
601	Humber Canal	3	0	M	Nil
602	4.8 km N.W. Glide Lake	2	0	L	"
603	Grand Lake	2	27	S	L
604	Glide Lake	2	0	S	Nil
605	Pynn's Bk.	3	474	L	M
605A	6.4 km W. Wetstone Pt.	2	0	M	Nil
606	Pynn's Bk.	2	70	L	L

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
607	Pynn's Bk.	2	733	S	S
608	Pasadena	2	0	S	Nil
609	Blue Gulch Pond	2	0	L	"
610	15.4 km S. Frenchman's Pond	2	0	Nil	"
610A	Hughes Bk.	2	0	L	"
611	Frenchman's Pond	2	0	Nil	"
611A	Hughes Bk.	2	0	"	"
612	Old Man's Pond	2	0	"	"
613	Hughes Lake	2	0	L	"
613A	" "	2	0	Nil	"
614	Old Man's Pond	2	131	"	L
615	Deer Lake	2	51	L	L
615A	" "	2	0	Nil	Nil
616	Otter Bk.	2	0	L	"
617	Old Man's Pond	2	0	S	"
618	Goose Arm	2	28	L	L
619	8.0 km N. Old Man's Pond	2	28	Nil	L
620	6.5 km S. North Lake	2	13	"	L
620A	North Lake	2	0	L	Nil
621	Goose Arm Rd.	2	0	Nil	"
622	" " "	2	0	L	"
623	" " "	2	0	S	"
624	" " "	2	14	S	L
625	North Arm	2	89	L	L
626	Trout River	2	106	S	L
627	Trout River Pd.	2	0	L	Nil
628	Governor's Pond	3	488	L	M
629	Bonne Bay Big Pond	2	0	L	Nil
630	Bonne Bay Little Pond	2	50	Nil	L
631	East Lomond River	3	360	"	M
632	Bonne Bay Little Pond	2	0	S	Nil
632A	Governors Pond	2	0	L	"
633	Southeast Hill	2	663	Nil	S
633A	East Lomond River	2	56	S	L

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
634	6.4 km E. Glenburnie	2	93	S	L
635	Glenburnie	1	382	L	S
636	East Arm (G.M.N. Park)	2	0	L	Nil
637	" " " "	2	40	M	L
638	Deer Arm " "	3	245	S	L
639	" " " "	2	0	M	Nil
640	Deer Pond " "	2	79	L	L
641	Lobster Cove "	2	0	Nil	Nil
642	Bakers Bk. "	2	44	L	"
643	6.4 km E. Green Pt. (G.M.N. Park)	2	0	L	"
643A	Western Brook Hill (G.M.N.P.)	2	0	Nil	"
644	Western Brook Pond Area (G.M.N. Park)	2	0	S	"
645	St. Paul's Inlet (G.M.N.Park)	2	42	L	L
646	St. Paul's Inlet (G.M.N.P.)	2	0	L	Nil
646A	9.6 km E. of St. Paul's (G.M.N.P.)	2	82	Nil	L
647	Cow Head	3	226	"	L
648	Shallow Bay (G.M.N.Park)	2	133	M	L
649	6.4 km E. Cow Head	2	42	S	L
650	9.6 km E. Belldown's Point (G.M.N. Park)	2	100	S	L
650A	Parsons Pond	2	0	Nil	Nil
651	9.6 km N. Baie Verte	2	0	S	"
652	12.8 km N. Baie Verte	2	38	L	L
653	4.0 km S. Fleur de Lys	2	0	M	Nil
655	3.2 km S.W. Little Lobster Hr.	3	256	S	L
656	Cat Arm River	2	0	L	Nil
657	" " "	3	409	S	M
658	" " "	2	0	Nil	Nil

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
662	Little Harbour Deep River	2	89	M	L
663	" " "	3	355	S	M
665	8.0 km S.W. Great Harbour Deep	2	0	Nil	Nil
667	Great Harbour Deep River	2	0	L	"
668	Soufflet's River	2	41	L	L
669	Cloud River	2	68	M	L
670	Bide Arm	2	147	M	L
671	6.4 km E. Roddickton	3	826	S	S
672	6.4 km N. Conche	2	0	L	Nil
673	8.0 km N.E. Roddickton	2	741	S	S
674	4.8 km S. Coles Pond	2	74	S	L
675	6.4 km N. Roddickton	2	71	S	L
676	Roddickton Rd.	1	441	S	S
677	Beaver Brook	2	65	S	L
678	Northwest Arm	3	546	S	M
679	Boony Lake	2	638	S	S
680	Roddickton Rd.	2	0	M	Nil
681	8.0 km W. Boony Lake	2	686	L	S
682	Middle Gulch Bk.	2	0	Nil	Nil
683	Leg Pond	2	0	L	"
684	" "	3	493	S	M
685	6.4 km N. Castor's River	2	37	Nil	L
687	9.6 km E. Port aux Choix	2	96	"	L
688	East River	2	0	L	Nil
689	Western Brook Pd.	2	92	S	L
689A	" " "	2	87	S	L
690	8.0 km S. Western Brook Pond	2	0	S	Nil
691	Hawkes Bay Rd.	3	352	L	M
692	Hawkes Bay Logging Rd.	2	0	S	Nil
693	" " "	2	75	S	L

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
694	Eastern Blue Pond	2	0	L	Nil
695	Little Brook Pd.	2	0	Nil	"
696	River of Ponds	2	28	L	L
697	Hawkes Bay Logging Rd.	2	94	L	L
698	Western Blue Pond	1	392	S	S
698A	" " "	2	0	S	Nil
699	Hawkes Bay Logging Rd.	2	71	L	L
700	8.0 km S. River of Ponds Lake	2	48	S	L
701	9.6 km N. Bell-burns	1	567	L	S
702	8.0 km N.E. Bellburns	3	13	S	L
703	Bellburns	2	0	L	Nil
704	4.8 km E. Bell-burns	3	865	S	S
705	8.0 km N. Daniels Hr.	2	0	L	Nil
706	Brian's Pond	3	401	S	M
706A	" "	2	46	M	L
707	Portland Creek	2	0	L	Nil
707A	Parsons Pond	2	0	Nil	"
708	8.0 km N. Parsons Pond	2	29	L	L
708A	11.2 km N.E. Parsons Pond	3	513	S	M
709	Ten Mile Lake	3	357	S	M
710	" " "	3	690	S	S
711	" " "	2	0	L	Nil
712	Roddickton Rd.	3	736	M	S
713	Salmon River	2	31	S	L
713A	" "	3	755	S	S
714	Southwest Brook	2	83	L	L
715	" "	3	390	S	M
716	20.0 km W. Main Bk.	2	102	S	L
717	16.0 km W. Main Bk.	2	0	L	Nil
717A	4.8 km E. Round Lake	2	0	M	"

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
718	10.0 km N.E. Round Lake	2	0	L	Nil
720	Benoit's Cove	1	848	S	S
721	Frenchman's Cove	1	467	S	S
722	Gillams	3	379	L	M
724	Balance Point	2	45	Nil	L
726	32 km S. Cox's Cove	2	0	L	Nil
729	Halfway Point	2	0	Nil	"
730	Serpentine Lake Rd.	2	0	S	"
731	Little Cook's Pd.	2	0	L	"
732	Serpentine Lake Rd.	2	0	S	"
733	Serpentine Lake	2	0	L	"
734	" "	2	129	Nil	L
735	Big Cook's Pond	2	23	L	L
736	Little St. George Pond	2	116	L	L
737	Stag Lake	2	0	L	Nil
738	Pinchgut Lake	2	0	L	"
739	" "	2	0	L	"
740	Big Gull Pond	2	0	Nil	"
741	" " "	2	35	L	L
742	" " "	2	0	Nil	Nil
743	George's Lake	2	773	S	S
743C	" "	2	0	L	Nil
744	" "	2	19	S	L
745	Beaver Pond	2	109	M	L
746	" "	2	0	Nil	Nil
747	4.8 km S. Serpentine Lake	2	0	"	"
748	Serpentine Lake	2	53	"	L
749	Middle Blue Hill Bk.	2	39	M	L
750	" " "	3	325	L	M
751	Spruce Bk.	2	0	Nil	Nil
752	" "	2	37	M	L
753	" "	2	0	L	Nil
754	" "	2	0	M	"
755	George's Lake	3	251	M	L
756	Island Pond	2	0	S	Nil
757	Grand Lake Bk.	3	418	S	M
757C	Camp 33 Rd.	2	0	M	Nil

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
758	Moose Pond	2	26	M	L
759	Gallants	2	0	S	Nil
760	"	2	26	S	L
761	Landowns Pond	2	35	L	L
762	North Bk.	2	0	S	Nil
763	Phillips Bk.	2	0	L	"
764	" "	2	68	S	L
765	" "	2	44	M	L
766	" "	2	29	S	L
767	" "	2	24	S	L
768	Romaines Bk.	2	67	L	L
769	Phillips Bk.	3	340	S	M
770	Cache Valley	2	150	M	L
771	Fox Island River	2	63	S	L
772	" " "	3	402	L	M
773	Romaines Bk.	2	117	S	L
774	Crooked Lake	2	23	L	L
775	" "	2	77	L	L
776	Jack Burke Pond	3	779	L	S
776C	Harry's Bk.	2	0	L	Nil
777	Mistaken Pond	2	0	Nil	"
778	Trout Bk.	2	719	S	S
779	" "	2	48	S	L
780	Hare Hill	2	0	Nil	Nil
781	Caribou Bk.	2	0	"	"
782	Bottom Bk.	3	734	S	S
783	" "	3	431	S	M
784	" "	3	540	S	M
785	Southwest Bk.	2	117	S	L
786	" "	3	750	S	S
787	Little Barachois Bk.	2	27	L	L
788	" " "	2	0	Nil	Nil
789	Southwest Bk.	2	0	S	"
790	" "	1	358	S	S
791	Bottom Bk.	2	719	S	S
792	Southwest Bk.	3	370	S	M
793	Barachois Prov. Park	2	133	S	L
794	" " "	2	994	S	S
795	Mattis Pt. Pond	2	30	S	L

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
796	St. George's River	2	0	S	Nil
797	Long Gull Pond	2	82	M	L
798	Blanche Bk.	2	57	S	L
799	Cold Bk.	2	17	S	L
800	4.8 km S. Point au Maul	2	30	L	L
801	Man of War Cove	2	0	L	Nil
802	Piccadilly	2	0	Nil	"
803	4.8 km N. Ship Cove	2	0	"	"
804	Harry's Bk. (Port au Port)	2	0	"	"
805	Victor's Bk.	2	0	"	"
806	6.4 km E. Mainland	2	72	L	L
807	Barachois Bk.	3	384	Nil	M
808	Shallop Cove	2	978	S	S
809	Flat Bay Rd.	2	21	S	L
810	Steel Mtn. Rd.	3	821	S	S
811	" " "	3	1110	S	S
812	" " "	1	552	S	S
813	Flat Bay Bk.	2	52	L	L
814	" " "	3	511	S	M
815	Middle Bk.	3	256	L	L
816	St. Teresa	1	826	M	S
817	Fischell's River	3	601	S	M
817C	" "	1	418	S	S
818	" "	2	118	M	L
819	Mount Howley	2	53	L	L
820	Fischell's River	2	0	Nil	Nil
821	6.4 km S.E. Fischell's (T.C.H.)	3	378	L	M
822	Robinson's River	3	604	S	M
822C	" "	2	60	L	L
823	" "	2	120	S	L
824	" "	2	27	S	L
825	" "	2	0	Nil	Nil
826	" "	2	0	S	"
827	Barachois Bk.	2	0	S	"
828	" "	2	0	L	"
829	Camp 180 Rd. (Crabbes River)	3	787	S	S
830	Jeffery's	3	366	L	M

APPENDIX I - Continued

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
831	Jct.St.Fintans Rd. & T.C.H.	3	1192	S	S
832	Crabbes River Rd.	3	375	M	M
833	Camp 180 Rd.	2	0	L	Nil
834	Crabbes River	3	166	L	L
835	" "	2	131	S	L
836	" "	2	0	S	Nil
837	6.4 km E. Codroy Pond	2	0	S	"
838	Highland River	3	484	S	M
839	Butter Bk.	1	767	S	S
840	1.6 km N.E. Codroy Pond (T.C.H.)	3	555	S	M
840C	Codroy Pond	2	0	S	Nil
841	North Branch	2	0	S	"
842	Codroy Pond	3	325	S	M
843	4.8 km S.W. Codroy Pond	3	378	S	M
843C	North Branch River	3	402	S	M
844	6.4 km N. Coal Bk.	1	556	S	S
845	South Branch	3	375	S	M
845A	Overfalls Brook	1	432	S	S
845C	South Branch	3	319	S	M
846	4.8 km N.E. O'Regan's	2	55	S	L
847	4.0 km S. Upper Ferry	3	1712	L	S
848	Mummichog Prov. Park	3	663	S	M
848C	" " "	3	283	S	L
849	4.0 km S. St. Andrews	2	38	S	L
Average			92		

APPENDIX I - Concluded

Plot	location	No. of branches sampled	Cumulative no. egg masses per 10 m^2 foliage	Defoliation* in 1977	Defoliation* forecast for 1978
LABRADOR					
1	Kenamu River	3	244	S	L
2	" "	2	599	M	S
3	" "	2	0	L	Nil
4	Mealy Mountains	2	49	M	L
5	" "	2	0	M	Nil
6	Mud Lake	2	77	L	L
7	" "	3	506	S	M
8	Traverspine River	2	0	Nil	Nil
9	" "	2	211	S	L
10	" "	2	24	L	L
11	Goose River	2	0	L	Nil
12	" "	2	0	L	"
13	Groves Point	2	0	L	"
14	" "	2	0	L	"
15	Mud Lake	2	0	M	"
16	Traverspine River	2	0	L	"
17	" "	2	0	L	"
18	" "	2	0	L	"
19	" "	2	0	M	"
20	Churchill River	2	0	L	"
Average			41		

*Defoliation

L = Light = 0 - 25%
M = Moderate = 26 - 75%
S = Severe = 76 - 100%

APPENDIX II. Results of spruce budworm hibernacula survey conducted March, 1978.

Location	Tree species	Average no. larvae/10 m^2	Population category*
Eastern Newfoundland			
Port Blandford	bF	599	H
Ocean Pond	"	5706	E
" "	"	972	E
" "	"	1842	E
" "	"	1601	E
" "	"	2019	E
Random Island	"	1041	E
" "	"	1191	E
Musgravetown	"	843	E
Elliott's Cove	"	1982	E
Lockston	"	2144	E
Lake St. John	"	514	H
Lady Cove	"	703	E
Lake St. John	"	1753	E
Bunyan's Cove	"	692	H
Charleston	"	894	E
Lake St. John	"	645	H
Mollyguajeck Lake	"	905	E
New Pond	"	1689	E
" "	"	1382	E
Knight's Cove	"	3219	E
Newman's Cove	"	2664	E
George's Pond	"	462	H
East end T.N.N. Park	"	2976	E
King's Cove	"	1952	E
Amherst Cove	"	2968	E
Upper Amherst Cove	"	2569	E
King's Cove	"	1153	E
T.N.N. Park	bS	744	E
Charlottetown Jct.(T.N.N.P.)	bF	916	E
Alexander Bay Station	"	1126	E
Blue Hills (T.N.N.P.)	"	1149	E
Charlottetown Jct.(T.N.N.P.)	"	976	E
Lake St. John	"	1104	E
Mason's Pond	"	597	H
Gambo Pond	"	1635	E
Triton Bk.	"	1885	E
" "	"	2162	E
" "	bS	437	H
Newton Lake	"	746	E
Gambo Pond	bF	2403	E
" "	"	1374	E

APPENDIX II - Continued

Location	Tree species	Average no. larvae/10 m^2	Population category*
Logy Bay	bF	823	E
1.6 km E. Torbay	"	1012	E
1.6 km N. Flatrock	"	1173	E
Pouch Cove	"	1313	E
4.8 km S.W. Pouch Cove	"	251	M
Bauline Line	"	98	L
Indian Meal Line	"	342	H
St. Phillip's	"	176	M
Old Broad Cove Rd.	"	793	E
Cochrane Pond Rd.	"	403	H
Newtown	"	657	H
Bay Bulls Big Pond	"	1234	E
Salmonier Line	"	254	M
" "	"	193	M
Father Duffy's Well	"	210	M
Jct. Whelan's Pond Rd.	"	607	H
St. Catherines	"	255	M
Forest Field	"	206	M
Holyrood	"	146	M
"	"	1171	E
1.6 km E. Kelligrews Access Rd.	"	381	H
Paddy's Pond	"	677	H
Average		1199	

Central Newfoundland

Leech Bk.	bF	1242	E
Noel Paul's Bk.	"	121	M
Badger	bS	27	L
Eastern Steady	bF	474	H
4.8 km N. Conne Pond	"	814	E
Twillick Bk.	"	714	E
Buchan's Rd.	bS	1116	E
West Pond	"	99	L
4.8 km N. Bernard's Bk.	bF	814	E

APPENDIX II - Continued

Location	Tree species	Average no. larvae/10 m^2	Population category*
Head Baie D'Espoir	bF	528	H
Noel Paul's Bk.	"	103	L
Hungry Hill	"	106	L
Harpoon Bk.	bS	63	L
South Twin Lake	bF	1183	E
West Pond	bS	174	M
Badger	bF	132	M
Hungry Hill	"	105	L
" "	"	56	L
Hr. Breton Rd.	"	966	E
Badger	bS	58	L
Great Rattling Bk.	bF	1823	E
" " "	bS	556	H
Miquels Lake	bF	3262	E
West Arm Bk.	"	416	H
Millertown Jct.	"	164	M
St. Joseph's Cove	"	861	E
12.6 km N. Conne Pond	"	587	H
New Bay Rd.	"	517	H
New Bay Pond	"	3021	E
" " "	"	911	E
" " "	"	689	H
Great Rattling Bk.	"	1562	E
Webber Pond	"	1480	E
Great Rattling Bk.	"	1934	E
Weirs Bk.	"	1234	E
Lewis Lake	"	560	H
Aspen Bk.	bS	541	H
3.2 km S. Bernard's Bk.	bF	498	H
Milltown	"	1500	E
North Twin Lake	"	1095	E
South Twin Lake	"	1450	E
Mark's Lake	bF	2078	E
North Twin Lake	bS	649	H
South Arm	bF	735	E
Gander Bay	"	402	H
" "	"	2728	E
" "	"	1064	E

APPENDIX II - Continued

Location	Tree species	Average no. larvae/10 m^2	Population category*
South Arm	"	1538	E
South Twin Lake	"	972	E
Gander River	bS	1224	E
Gander Bay Rd.	bF	1001	E
Norris Arm	"	1348	E
South Twin Lake	"	1883	E
Lewisporte	bS	1148	E
North Twin Lake	bF	734	E
Crooked Lake	"	207	M
Kippen's Pond	"	1143	E
Borney Lake	"	607	H
" "	"	2667	E
Newstead	"	1397	E
Carmanville	bS	1541	E
Horwood	bF	358	H
Gander Lake	"	3862	E
Gambo	"	2425	E
Carmanville	bS	481	H
Gander Lake	bF	361	H
Burnt Point	"	889	E
South Pond	bS	381	H
Bear Lake (Norris Arm)	bF	636	H
Cornfield Lake	"	1212	E
Hodges Hill	"	398	H
Dans Pond	bS	573	H
South Pond	"	386	H
Lewisporte	bF	1353	E
Birchy Bay	"	6487	E
Dans Pond	"	1016	E
Rattling Lake	"	1353	E
Peace Pond	"	601	H
Northern Arm Bk.	"	907	E
6.4 km S.E. Dans Pond	"	954	E
Rocky Pond	"	701	E
Watcher's Bk.	"	1560	E
Conne River	"	318	M
Southeast River	"	1134	E

APPENDIX II - Continued

Location	Tree species	Average no. larvae/10 m^2	Population category*
Deadwolf Bk.	bF	896	E
Conne River	"	715	E
Burnt Bay Lake	"	1640	E
Deadwolf Bk.	bS	458	H
Conne River	bF	1533	E
River Pond	"	893	E
New Bay Pond	"	831	E
Diversion Lake	bS	634	H
Duder Lake	bF	968	E
Soulis Pond	"	1027	E
Gander Lake	"	1283	E
Ten Mile Lake	bS	591	H
Weirs Pond	"	557	H
4.8 km W. Lemotte's Lake	"	289	M
Gander Bay	"	594	H
Lemotte's Lake	bF	649	H
Sandy Bk.	"	1345	E
Diversion Lake	bS	846	E
West Lake	"	476	H
Weir's Pond	bF	1441	E
" "	"	922	E
Gander Lake	"	959	E
Long Lake	"	984	E
" "	"	768	E
Barry's Lake	"	1890	E
" "	"	779	E
Buchan's Rd.	"	295	M
Greenwood Bk.	"	195	M
Southwest Bk.	bS	221	M
Davis Pond	"	320	M
Millertown	bF	494	H
4.8 km N. St. Veronica's	"	426	H
Gander Lake	"	623	H
Little Dead Wolf Pond	"	1997	E
Rodney Pond	bS	756	E
Southwest Pond	bF	339	H
9.6 km N. South Pond	bS	694	H
Caribou Lake	bF	397	H
Winter Brook	"	207	M
Hunt's Pond	"	6951	E
Little Gull Lake	"	354	H
Glenwood	"	1803	E
N.W. Gander River	bS	749	E

APPENDIX II - Continued

Location	Tree species	Average no. larvae/10 m^2	Population category*
Indian Arm Pond	bF	978	E
Island Pond	"	1119	E
Miquel's Lake	"	1104	E
Average		1000	
Western Newfoundland			
East Pond	bF	312	M
" "	"	219	M
Chain Lakes	"	245	M
Sheffield Lake	"	612	H
Deer Lake	"	57	L
Belburns	"	401	H
Hawkes Bay	"	8	L
Belburns	"	581	H
Hawkes Bay	"	85	L
River of Ponds	"	252	M
Brian's Pond	"	252	M
Belburns	"	141	M
Brian's Pond-Daniel's Hr.	"	255	M
Roddickton	"	131	M
Roddickton Rd.	"	268	M
" "	"	125	M
Main Bk. Rd.	"	400	H
Roddickton Rd.	"	162	M
" "	"	28	L
Beldowns Pt.	"	155	M
Ten Mile Pond	"	69	L
St. Paul's Inlet	"	60	L
Goose Arm Rd.	"	183	M
Sheffield Lake	"	42	L
Glide Bk.	"	80	L
Little Bonne Bay Pond	"	159	M
Goose Arm area	bS	114	L
Roddickton	bF	23	L
Conche Rd.	"	46	L
Beaver Lake	"	73	L
Deer Lake	"	145	M

APPENDIX II - Continued

Location	Tree species	Average no. larvae/10 m^2	Population category*
Gilliard's Bk.	bF	744	E
Glide Lake	"	102	L
Pynn's Bk.	"	133	M
Birchy Lake	"	292	M
Sop's Arm Rd.	"	584	H
Robinson's River	"	117	M
Bottom Bk.	"	175	M
Cold Bk.	"	234	M
Western Arm	"	353	H
Barachois Prov. Park	"	230	M
Gallants	"	199	M
Adies River	bS	275	M
Camp 33 Rd. (Grand Lake)	bF	460	H
Gallants	"	117	M
Harry's Bk.	"	189	M
Birchy Ridge	"	93	L
Phillip's Bk.	"	260	M
Serpentine Lake	"	97	L
Lost Pond	"	112	M
Trout Bk.	"	109	L
Robinson's River	"	11	L
Adies Lake	"	286	M
Corner Bk. Lake	"	263	M
Birchy Basin	"	161	M
Hampden	"	308	M
Birchy Ridge	"	345	H
Landowns Pond	"	141	M
Deadwater Bk.	"	190	M
Crabbes River	"	521	H
" "	"	432	H
Birchy Ridge	"	256	M
St. Georges	bS	610	H
Barachois Prov. Park	bF	361	H
Serpentine Lake	"	213	M
Steel Mtn. Rd.	"	301	M
Serpentine Lake	"	239	M
North Branch	"	1340	E
4.8 km S. Pinchgut Lake	"	176	M
North Branch	bS	518	H
Rocky Bk.	bF	195	M
Middle Bk.	"	1429	E

APPENDIX II - Continued

Location	Tree species	Average no. larvae/10 m^2	Population category*
North Branch	bF	219	M
Crooked Feeder	"	234	M
North Branch River	"	566	H
Codroy Pond	"	608	H
Fishell's River	"	546	H
Jeffery's Rd.	"	1943	E
Wiltondale	"	383	H
3.2 km N. Codroy Pond	"	389	H
Cormack Jct.	"	417	H
Highland's River	"	296	M
Sandy Lake	"	574	H
Bonne Bay Pond	"	206	M
Deer Bk.	"	117	M
Burlington Rd.	"	978	E
Baie Verte Jct.	"	784	E
Burlington	"	423	H
LaScie Rd.	"	286	M
Flatwater Pond	"	348	H
Mings Bight	"	361	H
Southwest Bk.	"	381	H
Middle Arm	"	123	M
Baie Verte	"	478	H
Little Rapids	"	605	H
4.8 km N. St. Andrews	"	568	H
Mummichog Prov. Park	"	432	H
Hampden	"	420	H
South Branch	"	787	E
4.8 km N.South Branch River	"	416	H
Gallant's Rd.	"	389	H
Baie Verte Jct.	bS	707	E
Average		332	
Labrador			
Kenamu River	bF	319	M
" "	"	743	E
" "	"	98	L
Mealy Mountains	"	352	H

APPENDIX II - Concluded

Location	Tree species	Average no. larvae/10 m^2	Population category*
Mealy Mountains	bF	860	E
" "	"	89	L
Mud Lake	"	1308	E
Traverspine River	"	186	M
" "	"	94	L
" "	"	327	H
Kenamu River	"	390	H
Average		433	

*

Population category		Avg. no. larvae/ 10 m^2
L = Low	=	1-108
M = Medium	=	109-323
H = High	=	324-700
E = Extreme	=	700+